

AMERICAN JOURNAL OF OPHTHALMOLOGY

CONTENTS

Original Papers	Page
Examination of the fundus oculi by light of a limited spectral range. Margaret Austin Dobson.....	431
Velonoskiascopy. L. W. Morsman.....	433
Technique of conjunctivoplasty. Eduard Szokolik.....	438
Birth trauma to the cornea. E. E. Blaauw.....	440
Reflection illuminator for perimetric studies of bedridden patients. John N. Evans.....	444
Ophthalmic pathology, report of the section on ophthalmic pathology of the Army Medical Museum. George R. Callender and Helenor Campbell.....	447
Serum disease and serum accidents. Frederick T. Lord.....	451
Iridoschisis. Carl Hobart.....	454
Sympathetic ophthalmia with myopia as initial symptom. Charles M. Swab.....	461
Impressions of European eye clinics. Leo L. Mayer.....	464
Notes, Cases, Instruments	
Phlyctenular conjunctivitis. C. S. O'Brien.....	468
Some observations concerning the streak retinoscope. H. Maxwell Langdon	469
Society Proceedings	470
Philadelphia, New England, Nashville, Los Angeles, Brooklyn, Kansas City	
Editorials	481
Book Notices	485
Abstract Department	489
News Items	512

For complete table of contents see advertising page V

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OCULAR FUNDUS SEEN BY RED-FREE LIGHT



DEGENERATION AND HEMORRHAGE. (MARGARET A. DOBSON) SEE EXPLANATION WITH TEXT



FUNDUS. (MARGARET A. DOBSON) SEE EXPLANATION WITH TEXT

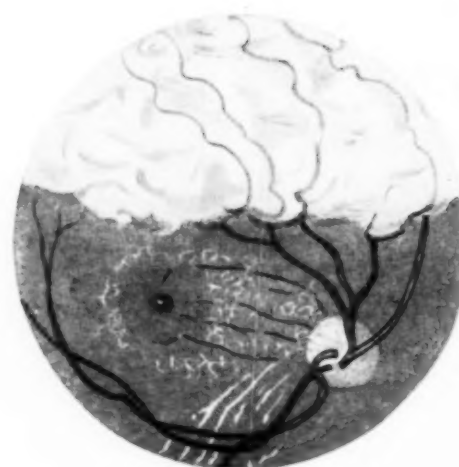


FIG. 3. RETINAL DETACHMENT. (MARGARET A. DOBSON) SEE EXPLANATION WITH TEXT

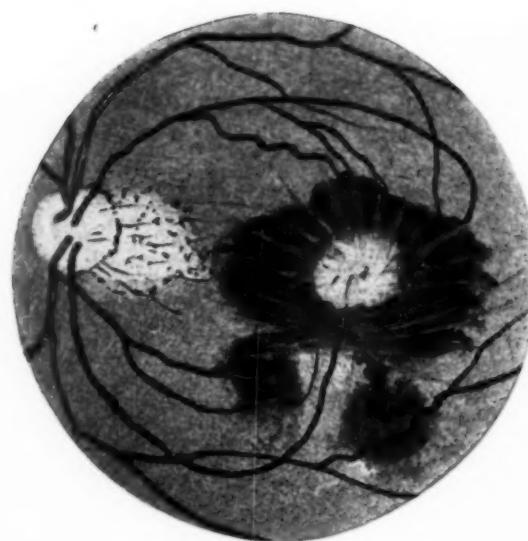


FIG. 4. HEMORRHAGE SURROUNDING THE MACULA. (MARGARET A. DOBSON) SEE EXPLANATION WITH TEXT

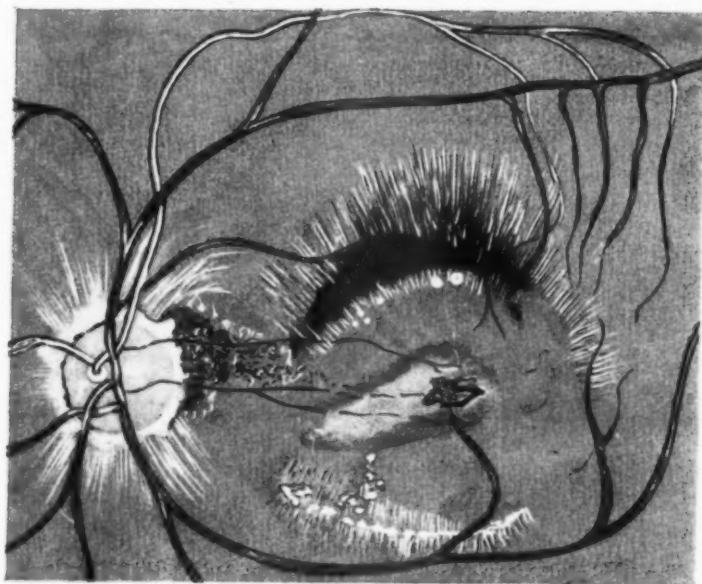


FIG. 1. MACULAR DEGENERATION AND HEMORRHAGE. (MARGARET A. DOBSON) SEE EXPLANATION WITH TEXT

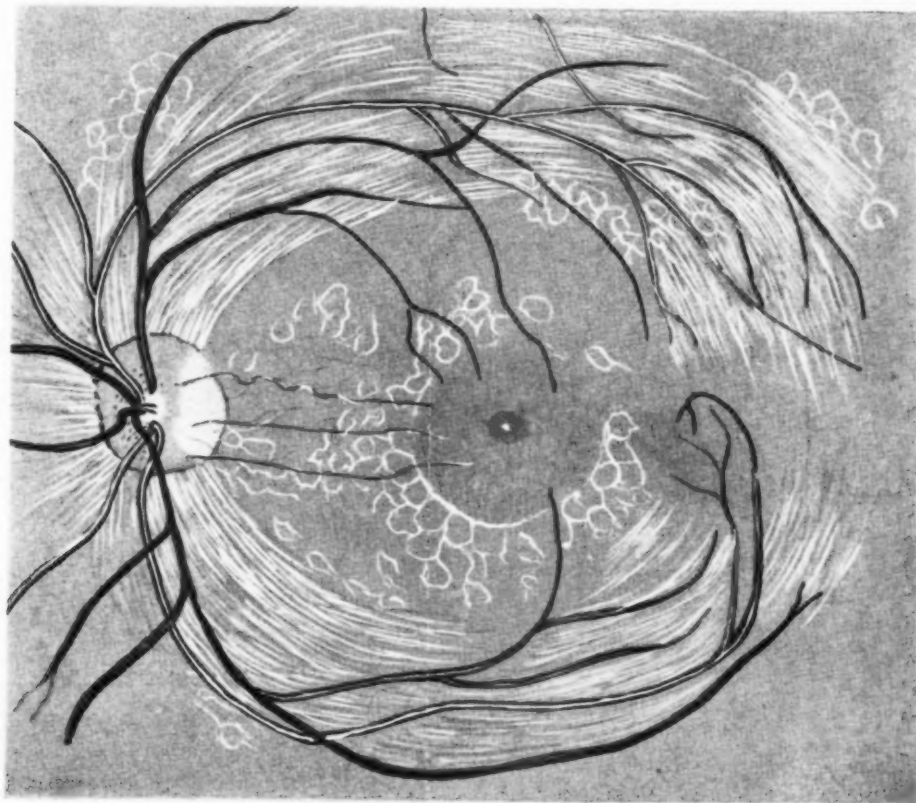


FIG. 2. A NORMAL (MYOPIC) FUNDUS. (MARGARET A. DOBSON) SEE EXPLANATION WITH TEXT

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EXAMINATION OF THE FUNDUS OCULI BY LIGHT OF LIMITED SPECTRAL RANGE

MARGARET AUSTIN DOBSON, M.D.

LONDON, ENGLAND

The principles of ophthalmoscopic examination of the ocular fundus with light of limited spectral range (red-free light) are briefly discussed, and some description is given of the appearance of normal and pathological structures of the fundus as thus seen. Four colored drawings, made with the aid of Salomonson's photographic ophthalmoscope, and reproduced in the frontispiece, illustrate respectively (1) macular degeneration and hemorrhage, (2) a normal (myopic) fundus, (3) retinal detachment, and (4) hemorrhage surrounding the macula.

The ophthalmoscope* used for making the drawings illustrating this paper (see text figure) is a modification of the original ophthalmoscope used for photographic purposes by the late Professor Salomonson of Amsterdam. The instrument consists of two optical systems, one for illuminating, and one for viewing the fundus oculi. A camera is attached to the viewing system. The source of light is a carbon arc lamp, which by means of condensing lenses and a rectangular prism is reflected from a small stainless steel mirror and brought to a focus at the pupillary margin of the eye under examination. This light is much more satisfactory than a mercurial vapor lamp, which is firstly not intense enough, and secondly produces a fluorescence of the lens which greatly blurs the picture.

A filter is interposed between the light and its reflection from the small mirror. The filter is a solution of the dye aniline green naphthol B in glycerine, and is placed in a thin glass cell, with optically perfect flat surfaces.

The spectrum obtained after passing the light through this solution shows a broad green band, a narrow yellow band, and a haze of blue-violet. The red rays of the spectrum are entirely cut off and the heat rays are blocked out. A Kodak-Wratten celluloid filter cemented between glass, no. 61 n, is almost identical with the above fluid

filter. A scarlet geranium when viewed through either of these screens looks black in sunlight.



Salomonson's photographic ophthalmoscope

The ocular fundus when viewed by this limited spectral light is most striking. The choroid is almost invisible, and the retina, from absorption and reflection of the green rays, is colored a light pea-green. The retinal vessels appear almost black, with a distinctly brown tinge when the pigment of the eyeground is not abundant. A strong white central streak is seen which is much more pronounced in the arteries than in the veins. The vessels can be traced much further than with ordi-

* May be obtained from Messrs. Heath, London.

nary light, and their ramifications at the fovea are distinct.

Nerve fibers, white and glistening, can be seen to radiate from the disc in all directions; but those most clearly visible are the arcuate fibers arching from the temporal half of the disc to embrace the macular area and to meet in a horizontal raphe beyond. Exudations look remarkably white and flocculent, and appear to be heaped upon the optic disc, retina, or blood vessels like small snowdrifts. Connective tissue looks whiter in this fierce light.

The fovea is very distinct, owing to its peculiar and specialized yellow pigment, the color of which is intensified by the addition of a copper sulphate glass screen, being by this means warmed to an almost orange hue. The color is most intense at the macula lutea, less intense as the boundaries of the fovea are reached.

At the macula lutea, where cones preponderate, yellow pigment is in evidence. At the fovea centralis, where cones only are found, this yellow pigment abounds. It is a special pigment having a protective or chemical action upon the cones. The changes it undergoes in pathological conditions are of great interest. In atrophic conditions of the retina, the macula lutea appears

to become enlarged, and is sometimes seen to have a crenulated edge. It is then bright yellow in color, resembling much more the macular color after death.

Preretinal exudations obliterate the color, and postretinal exudations throw up and intensify the color. The macula, and therefore the macular yellow color, is said to be congenitally absent in albinos, in all cases of total color blindness, and in aniridia (Vogt, Zurich). In the most advanced cases of choroidal and retinal atrophy the position of the macula may be detected by its irregular shape and lemon yellow color.

By means of red-free light very superficial detachments of the retina can be detected. In cases of exudation or hemorrhage at the fovea, the membrana limitans interna is often seen to be thrown into radiating folds.

It may be said that monochromatic yellow light is most useful in the examination of the retinal blood vessels, that a yellow-green light shows best the nerve-fiber radiations, and that a blue-green light demonstrates the fact that the yellow color of the macula is present during life and not only after death.

10 Seymour street, W.1

Explanation of Dr. Dobson's colored drawings (see frontispiece) of the ocular fundus as seen by red-free Light

Plate 4, Fig. 1. Mr. A., aged 34 years. Left eye always defective, but rapid deterioration has been noticed during the past two months. There is an old lesion of the macular region, which is completely degenerated, having lost all traces of yellow pigment. Outside the macular region is a much more recent lesion, a large hemorrhage situated in the fiber layer of the retina shows the distribution of the retinal nerve fibers. A white collar of degeneration with a crenulated edge surrounds the optic nerve, which is partly atrophied. Nerve fibers are seen to radiate from the disc, on the temporal side of which is also seen a cone-shaped area of degeneration. (Red-free glass filter.)

Plate 4, Fig. 2. Miss L., aged 54

years. Fair hair, slate colored eyes. Myopic. The distribution of nerve fibers is well seen. Fibers of the papillomacular bundle cannot be detected. Very little pigment is present in the eyeground. A white network is seen surrounding the macular area, and elsewhere. The nature of this network is doubtful, it may represent a reflex from the capillaries. The yellow pigment of the macula lutea is well seen, and the fovea centralis is represented by a brilliant white round spot. (Red-free glass filter.)

Plate 4, Fig. 3. Miss B., aged 54 years. Three weeks old detachment of the retina above. Surrounding the macular area and occupying the papillomacular space, a fine white network is seen, which may be a reflex from the

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retinal capillaries. The macula lutea has a bright yellow-brown coloration. Fine white streaks below and to the temporal side of the disc are probably folds of the internal limiting membrane, and suggest a commencing detachment of the retina in this position. (Kodak-Wratten celluloid filter, no. 54.)

Plate 4, Fig. 4. Mrs. P., aged 38 years. Very recent hemorrhage sur-

rounding the macula. The fovea and the macula lutea are entirely covered by a white exudate. Upon the surface of the hemorrhagic exudate the superficial layers of the retina are thrown into radiating folds, those below tend to become horizontal. Two smaller hemorrhages below the main hemorrhage have a distinct yellow color. (Red-free glass filter.)

VELONOSKIASCOPY

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The test described and illustrated, and which was proposed by Trantas in 1921, is based upon the apparent shadow produced when a needle or other narrow linear object is held between the eye of the observer and a distant white line with which the test object is parallel. The test has been used for the measurement of spherical errors, but more particularly in the estimation of astigmatism.

The term velonoskiascopy was given to a new test for astigmatism by Trantas, an oculist of Constantinople.* Based on the Greek word βελώνη meaning a needle, it carries the sense of "viewing the needle shadow" (one of the first methods of applying the test having been by holding before the eye a fine linear object, such as a thread or a needle). Trantas, himself astigmatic, found that when he held up such an object before his uncorrected eye and looked at a chalk line drawn on a blackboard, the intercepting object seemed to throw a "shadow" on the chalk line. He worked out the physiological reasons for this and other observations and soon practiced a new method of testing for astigmatism on his patients.

Trantas' publication of his observations brought letters of protest as to priority in the discovery of principle. It was pointed out that Léonard, as far back as the year 1882, had demonstrated that the shadow of the needle held close to the eye, while viewing a bright distant point, appeared sometimes upright and sometimes inverted. This Léonard reported with his observations in ametropia. Later in 1900

a Russian author—Bonwetsch—described practically the same observations. Holth² in 1904 gave a full description of this method, under the name of skiakinescopy (viewing a moving shadow). (*Nouveau procédé pour déterminer la réfraction oculaire. Annales d'Oculistique*, 1904, vol. 131, p. 418.)

Van den Bergh³ (*Annales d'Oculistique*, 1904, vol. 132, p. 273) described this method with a modification. He did not observe a line but the top of a triangle. Van den Bergh then attempted to lay off a scale on the angle of the triangle and to determine the amount of astigmatism by observing the extent of the angle filled by the shadow of the thread. After a year he gave up the method as entirely impractical.

To understand the optical principles involved in the method of Trantas one must remember that only the emmetropic eye (or one made emmetropic by accommodation or with correction) receives a clear picture on the retina. To the ametropic eye all points of distant objects become diffusion circles. When one meridian is more out of focus, as in astigmatism, then in that meridian the diffusion circles are larger. If one who is hyperopic or myopic in the vertical meridian looks at a white vertical line, then the line

* After the publication of Trantas' essay in 1921 he was, with many others, driven out of Constantinople by the Turks, and he is now located in Athens.

becomes a broad diffuse line, depending upon the amount of error. If he now holds a thread or needle across the pupil of the same meridian so that it bisects the line, then an interval of the diffusion line will be blocked out. Due to a well known physiological principle the interval will be filled in by the same color as the general background. Figure 1 illustrates this phenomenon. But in practice the object, being out of focus, will not appear clear cut as in the drawing.*

It was also brought out by Trantas that if the thread was not in the axis of the principal meridian of the as-

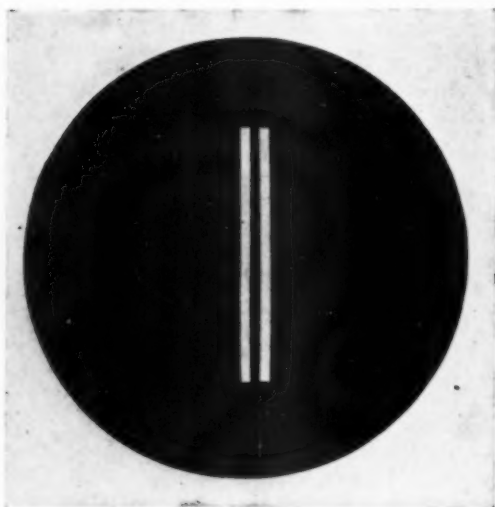


Fig. 1 (Morsman). Illustrating (schematically) a vertical white line made broad by diffusion circles. Dark line in center represents gap in diffusion line due to blocking out this portion with thread or needle held close to eye. Width of line and interval is dependent upon extent to which line is out of focus.

tigmatism then the interval in the diffusion circles, caused by the thread, was tilted toward the meridian on which the shadow was wider. (Fig. 2) After finding the principal meridian he drew another line at 90° from the first and had the patient alternately

hold the thread over the two lines. If the two intervals appeared equal this denoted no astigmatism—both principal meridians being equally out of fo-

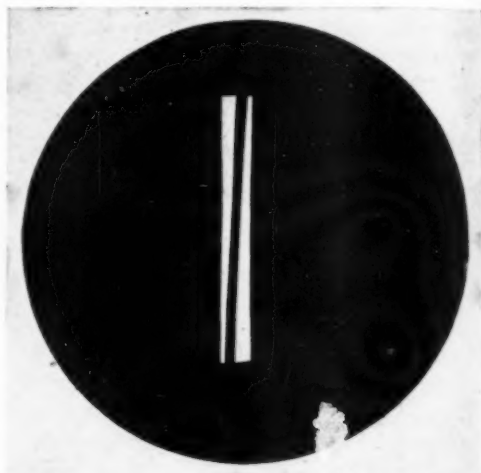


Fig. 2 (Morsman). Illustrating (schematically) a vertical white line made broad by diffusion due to astigmatism in corresponding meridian. Axis of line and of interval do not coincide. Interval line tilts toward meridian on which the shadow was of greater width.

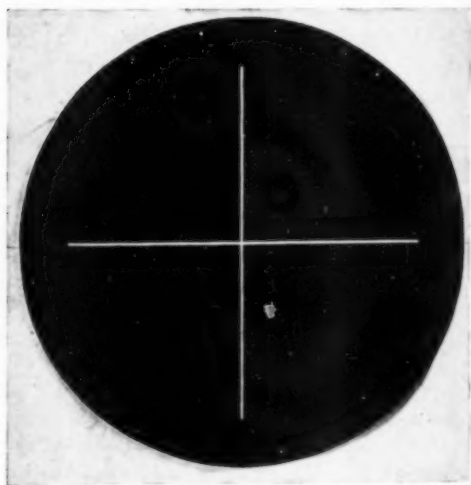


Fig. 3 (Morsman). One side of Lindner's wall chart. Chart is of stiff red cardboard 49 cm. in diameter. White strips are of paper 4 mm. wide and 38.5 cm. long, pasted at right angles to each other. Edge is perforated with metal eyelets for hanging on wall at desired axis. Black figures indicating degrees 0 to 180 are painted throughout one-half of margin. These were blotted out in illustration by photography.

* The drawings were made by author. The figures (except figure 5) are from charts used in his private practice. The original charts were made with white paper strips pasted on red cardboard. In the illustrations the red has photographed black.

cus. If the two intervals were unequal then sufficient cylinder was added to make them so, and the strength of cylinder necessary represented the astigmatism of the patient. Such in brief was the technique of Trantas.

Lindner,⁴ of the University of Vienna, became very much interested in the French reports and through experiment brought out new apparatus and technique.

First he designed a wall chart, illustrated by figure 3. This chart was made of a circular disc of red cardboard 49 cm. in diameter. The edge was perforated with metal eyelets so

were best when the white strips were 3 mm. wide and 12.5 cm. long. His procedure was then to find or prove the axis with this side of the chart and then turn the chart over and find the amount of astigmatism. Much time was consumed by the patient in losing the shadow and more time was lost in the comparison. Also there was likely to be great error in judgment.

Lindner therefore, after several attempts, devised a cross as illustrated in figure 5. This was made from a sheet of brass the proper size to fit in the regular trial case frame. The central portion was drilled and filed out and the metal enameled black. The arms of the cross are from 0.5 to 1 mm. in thickness. A fine brass line was left on one side for the use of the examiner as an axis marker. The patient can easily move the head slightly up or down and from side to side until the shadow lines appear in the two white lines of the wall chart, and he can observe at a glance whether the two intervals are equal and when they are

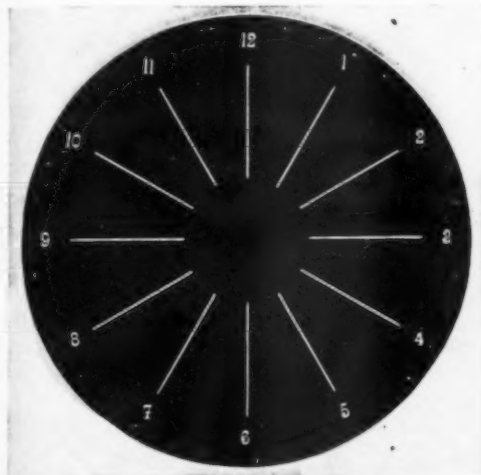


Fig. 4 (Morsman). Illustrates opposite side of Lindner's wall chart, used particularly for detection of astigmatic axis when using cross. Shadows appear in all lines when eye is out of focus. If there is astigmatism, the lines corresponding to the two principal meridians will have straight shadow lines. The other shadows will lean (outer end) toward the meridian with the broadest shadow line. This chart is practicable only with Lindner's improved disc for use in standard trial frame.

that the chart might be hung on the wall at the desired axis. Two white strips of paper 4 mm. wide and 38.5 cm. long were then pasted on at 90° from each other. By trial Lindner soon found that the axis could be more readily detected when more white strips were added. He then placed a clock dial arrangement on the opposite side of the chart. (Fig. 4.)

He found that the results of tests



Fig. 5 (Morsman). Trial frame disc of Lindner. Arms of central cross are 6 mm. long and from 0.5 to 1 mm. wide. Disc is made of sheet brass to fit trial case frame and is enameled black. Arms of cross are placed in the two principal meridians of the astigmatism to be tested and should bisect pupil of patient. There is a fine brass line on back of disc for use of examiner as axis marker.

made equal by superimposed cylinders. The wall chart is best placed at from four to six meters distance. The best diameter of the small circle in the disc was found to be six mm. The one mm. trial case cross is used by preference by the writer, with the wall chart placed at 4.5 meters.

Figure 6 illustrates the wall chart as seen by the patient when the two intervals are unequal, denoting astigmatism. Figure 7 gives the appearance when the head is moved too much up or down and one interval is lost. Figure 8 shows the appearance of the wall chart when the astigmatism is

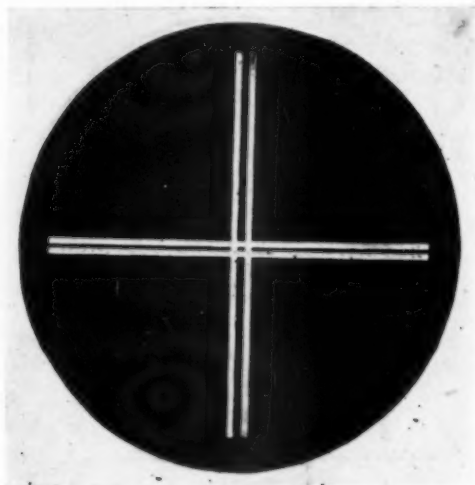


Fig. 6 (Morsman). Illustrates (schematically) appearance of wall chart as to the corresponding difference of width in shadow intervals caused by cross in disc when patient is astigmatic. This drawing represents author's impression with a +1.00 sph. +1.00 cyl. axis 90° added to his manifest correction.

corrected. Of course, the patient's eye being ametropic, the figures 6, 7, and 8 are correspondingly blurred and not clear-cut as in the drawings.

There are some things the examiner should consider before attempting to make tests for astigmatism by this method.

(1) Every student must himself be a patient so that he can know his patient's reactions. If he is not astigmatic he can make himself so with cylinders.

(2) Before⁶ applying this test he should already have refracted the patient and should know his manifest error.

(3) To the manifest prescription he must add at least a +1.00 sphere to

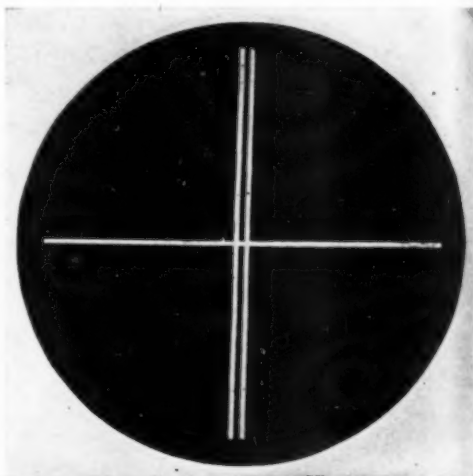


Fig. 7 (Morsman). Drawing to illustrate (schematically) appearance of wall chart when one white line is bisected by thread or trial case cross. Patient has yet to move head up or down to bring out the horizontal interval. (The whole chart appears blurred to the patient.)

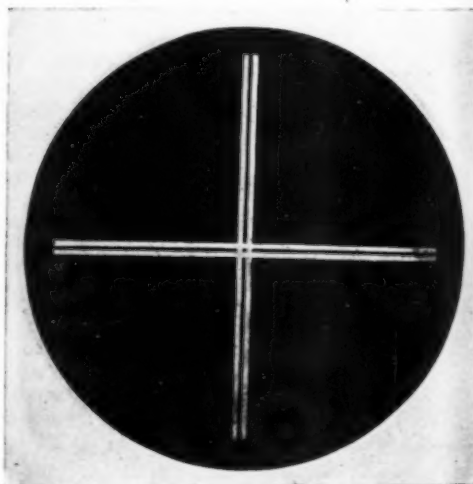


Fig. 8 (Morsman). Drawing of small chart used to illustrate to patient what he should see when astigmatism is corrected. (Author has miniature charts 108 mm. in diameter made of figures 6, 7, and 8 for the use of patients in studying what they are to see before tests are made.)

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be sure that the patient is ametropic in all meridians. If the patient is not thus rendered myopic he will likely change the findings by accommodation.* Again, if patient is not made myopic and his error is, for instance, -0.50 at 90° and $+0.50$ at 180° , he will find the shadows equal. The examiner may then believe the patient to be emmetropic when he has in reality one diopter of astigmatism.

(4) One must not be misled by assuming that the interval which appears broadest represents the greatest error. This is not so, from the physiological fact that diffusion circles become mostly lines in this case and overlap one another, thus producing what appears to the eye as a pronounced and heavy line in the meridian of greatest error. For example, if one looks at the wall chart with a $+2.00$ cylinder axis 90° before the eye (presuming the eye to be emmetropic), the vertical line will be broad and diffuse and contain a wide red interval shadow, while the horizontal line will be narrow and sharp and contain a narrow sharp interval due to overlapping of diffusion circles. Thus the rule: Correct the astigmatic error by placing the axis of the minus cylinder over the broad interval (with the patient made myopic with a plus sphere).

The technique then of velonoskiascopy is briefly outlined as follows:

(1) Refract the patient first as in your regular procedure.

*Lindner has said that he always believed that a patient could accommodate for astigmatic errors. Of this he now thinks there may be some question, as he finds the same error by velonoskiascopic tests with and without cycloplegics.

(2) Test eye separately as in refraction.

(3) Place the trial cross in the refraction frame (never a stationary frame such as the phoropter) with the arms of the cross in the principal meridians as found during retinoscopy and other procedures.

(4) Explain to the patient just what he is to look for and how to find it. As we are accustomed to focus vertical lines it is best to tell the patient to find the vertical interval first and then by moving the head slightly up and down to bring both into view. (The writer prefers to use 1 mm. arms in the trial case cross with the chart at 4.5 meters; and also to bring out the diffusion circles with a $+1.50$ sphere.)

(5) Now add cylinders until the intervals are equal. The best technique is to add a minus cylinder with its axis on the broadest interval.

(6) When the astigmatism is corrected, gradually reduce the amount of fogging sphere until the intervals due to diffusion circles disappear, and note if they remain equal to the last. The cylinder now in the frame represents the astigmatism of the patient, with its axis.

Lastly remember this is a subjective test and its value depends on the patient. Errors may be corrected to 0.12 diopter in many cases. With the less intelligent patient the test is doubtful and often worthless. In some cases where for any reason retinoscopy is doubtful and yet vision is normal it may prove the best method of finding the patient's astigmatic error.

205 Power building

References

- ¹Trantas. Velonoskiascopie. Soc. Franç., d'Opht., 1921, May, Ann. d'Ocul., 1921, v. 158, p. 458. Zeit. f. Augenh., 1927, Dec. p. 343.
- ²Holth. Nouveau procédé pour déterminer la réfraction oculaire. Ann. d'Ocul., 1904, v. 131, p. 418.
- ³Van den Bergh. Ann. d'Ocul., 1904, v. 132, p. 273.
- ⁴Lindner. Zeit. f. Augenh., 1926, Dec. p. 346.

THE TECHNIQUE OF CONJUNCTIVOPLASTY

EDUARD SZOKOLIK, M.D.

SZOMBATHELY, HUNGARY

Experience with conjunctivoplasty for covering a scleral wound (the flap only having united at a third attempt, when the previous attempts had left two small denuded conjunctival areas) suggested the advisability of excising a small triangle of conjunctiva to obtain firm adhesion of the flap. This method has proved uniformly successful.

Conjunctivoplasty is well known as one of the most valuable ophthalmic operations. One objection to it is that the stitches often pull out and therefore the flap does not become attached. I frequently use a conjunctival flap, but because of the tendency for the stitches to pull out I have always had the feeling that the technique needed improvement.

By what means can a conjunctival flap become attached at all? Two conditions may be considered:

- (1) the place that is to be covered with the flap;
- (2) how the flap is to be secured.

It makes a difference whether we have a cornea half of which is deprived of its epithelium, as in beginning corneal ulcer from gonorrheal conjunctivitis or in ulcerative trachomatous pannus, or whether there is a long standing small fistula of the cornea or a fresh cut of the sclera near the limbus, and so on.

In my last case of beginning corneal ulcer due to gonorrheal conjunctivitis, I made a very interesting observation. As I am favorably disposed to peritomy or peridectomy of the conjunctiva (see *Klinische Monatsblätter für Augenheilkunde*, May, 1927), therefore in the case of an adult with hazy cornea which was almost strangulated by very pronounced chemosis, complicated by intolerable pain, after some hesitation I made a circumcision near the cornea. Next day the pain had subsided, and to my surprise the upper half of the cornea was covered by the flap, which was firmly attached to it, a fact clearly demonstrated by probing. After protracted treatment the cornea was saved. In this case the overhanging conjunctiva was secured without sutures, merely by virtue of the freshly denuded cornea.

In ulcerative trachomatous pannus, according to my experience, only a well sutured conjunctival bridge can become attached, because of the usual shrinkage of the bulbar conjunctiva, which has moreover lost its elasticity. In the presence of corneal fistula, the best method should be first to touch the fistula and the surrounding cornea with the cautery and then to suture the flap carefully. A boy who recently came under my care had a fresh cut of the sclera near the limbus. The wound gaped widely and the vitreous protruded between its edges. I made a conjunctival flap in the manner commonly described and used, but next day the stitches had pulled out and the flap had slipped back. In spite of resuturing the flap and also making a conjunctival bridge, the flap again retracted. At a third attempt the flap became adherent and the eye escaped danger.

I learned much from this case and also discovered the probable reason why the sutures had pulled out at the first and second attempts and why they held on the third occasion. It had seemed undesirable to place the conjunctival sutures just over the scleral wound, on account of danger to the delicate tissues exposed between the edges. So I fastened the flap about five millimeters below the scleral wound to the surface of the normal conjunctiva, according to the usual Kuhnt method.

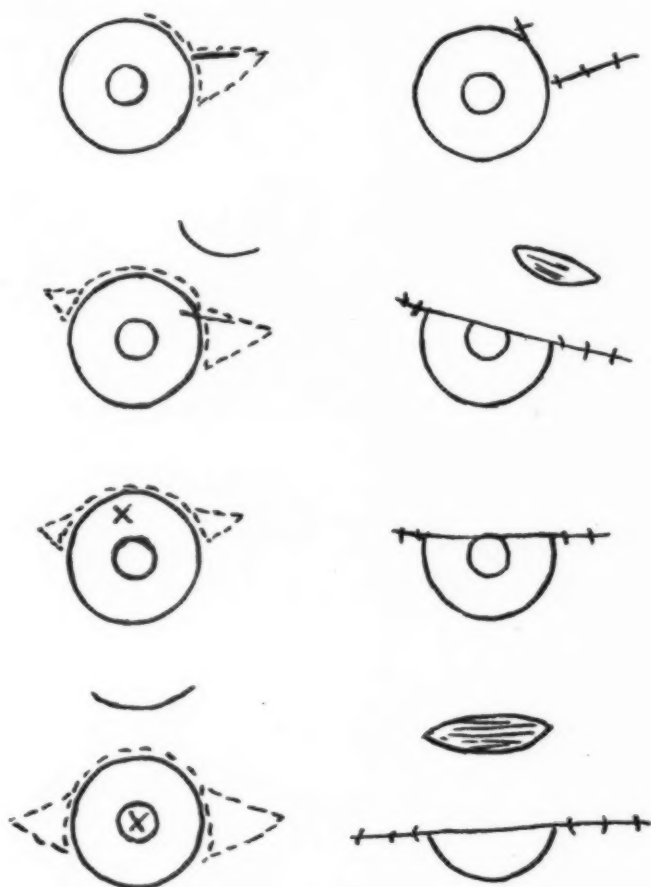
As a result of the sutures twice pulling out, there developed an area, about the size of a small pea, deprived of conjunctiva. At the third attempt this denuded area afforded an adequate means of holding the flap. We know that only surfaces which are bare of epithelium have a tendency to unite

with one another, provided that other conditions are favorable to adhesion of these surfaces.

This observation and these considerations suggested that, by excision of a triangle of conjunctiva combined with proper suture, one might be able to secure a conjunctival flap or bridge as definitely as in any other well executed plastic operation.

Since then I no longer find conjunctivoplasty a problem, for the flap always becomes attached, so that I recommend this method for trial by others.

The accompanying figure will indicate the principal types of conjunctivoplasty with triangular excision, before and after operation. The heavy lines represent incised wounds, the crosses fistula or ulcer of the cornea.



Conjunctivoplasty (Szokolik). Illustrating the principal types of conjunctivoplasty, with excision of a triangle. On the left side before, and on the right side after, completion of the operation.

BIRTH TRAUMA TO THE CORNEA

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In the author's patient, at the age of eighteen years, there were three or four fine lines behind the posterior surface of the cornea, partly attached to the cornea and partly lying free in the anterior chamber. These lines or delicate bands were regarded as being the remains of extensive detachment at Descemet's membrane, due to injury at birth. The literature of the subject is carefully reviewed.

At the beginning of this century two interesting papers on the subject of birth trauma to the eye—one by Thomson and Buchanan and the other by Bruno Wolf, an obstetrician—appeared in ophthalmic literature.

It had been noted before that the eyes in some newborn infants appeared as if they had suffered a parenchymatous keratitis after protracted labor or more especially after forceps delivery. This corneal cloudiness disappeared within a short period and the writer stated that no defects had remained. There have been but few reports of the examination of such children in later life.

Thomson and Buchanan examined four eyes microscopically and found them to show rupture of Descemet's membrane.

In 1909 R. R. James described linear opacities of the cornea in a child thirteen years old, due to birth injury.

It is seen therefore that ophthalmic literature before the days of the slit-lamp showed a paucity of cases of this nature which had been observed in later life.

In 1924 Byers of Montreal described two cases of this kind, examined with the slit-lamp. The first patient, a girl of six years, presented a faint linear scar two mm. wide extending across the cornea from eleven to five o'clock.

The second patient, a child aged four months, showed an S-shaped rupture of Descemet's membrane. In the discussion following the presentation of these cases Green of St. Louis related an instance of a seven year old girl in whom he had found a faint linear horizontal scar and a vertical rupture of Descemet's membrane. These were seen by focal illumination with a Zeiss binocular loupe.

Bedell of Albany, New York, found irregular branched folds in Descemet's membrane, and a diffuse corneal opacity in a boy fourteen years of age. In 1925 Byers added another instance in

which he found a triangular corneal opacity in the middle two-thirds of the pupillary area in a girl six years of age.

In opening a discussion on microscopy of the living eye at this time he said: "To be of value, studies in solving the pathogenesis of these corneal lesions demand exact verbal descriptions and more especially pictorial records covering periods of time." He quotes Spicer on the advantage of good drawings which convey an exact picture to the mind and remain a trustworthy record. These Byers presented in the report of this his third case.

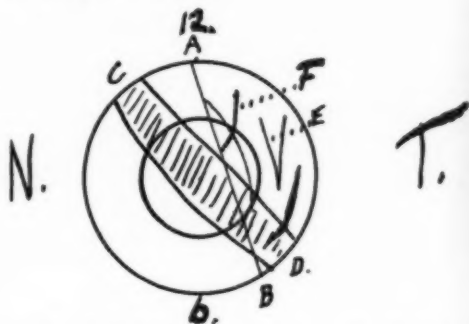


Fig. 1 (Blaauw). F, "glass fiber" (Glasleiste), suspended for two-thirds of its length in the anterior chamber. C to D, band of opacity. E, area which suggests partly detached membrane of Descemet. A to B, "glass fiber" passing through the anterior chamber.

In 1925 Bedell described a second case in a patient who was then thirty-one years old. Slit-lamp examination showed innumerable folds and ruptures in Descemet's membrane. The ruptures presented a sharp margin, and the folds were wavy and the margin rounded.

In the discussion, Feingold described a slit-lamp finding in which he had found a short narrow band of light behind the cornea. Repeated examina-

tions proved this to be a thin glassy band stretched across the posterior aspect of the cornea and in contact with it at two points, like the string of a bow. It apparently represented newly formed Descemet's membrane following the break, and a subsequent proliferation of the endothelium.

H. H. Kranz in 1924 described a case in a woman twenty-four years of age. She presented hemihypertrophy of the upper part of the body, Horner's symptom complex, and "Glasleiten" of Descemet's membrane. These two "Glasleiten," 0.5 mm. in width, are seen only by transillumination with the reflected light of the slit-lamp and impress one as having been formed by

ten days after birth. At that time the cornea of the left eye was completely opaque. Eserin was prescribed. He was again seen about six months later. At this time only a slight haze persisted in the central portion of the cornea. He returned from time to time. In April, 1905, the cornea had become somewhat clearer. A sketch in the record shows a few fine hair-like lines in the anterior chamber, and a note reads: "wrinklins of lens capsule" (?) Five years later a swelling in the lower conjunctival fornix was removed. This had no connection with the original injury.

Present condition: The left eye presents an oblique band extending from



Fig. 2 (Blaauw). Stereophotograph of Von der Heydt's case.

the bursting of a bubble, because of their sharp edges, which latter project into the anterior chamber.

These very few observations made in later life are now supplemented by my case.

Case: I. G., now eighteen years old, has in the left eye vision of fingers at one meter. I saw him for the first time March 8, 1926. The condition has remained unchanged to date (March, 1928). The right eye has slight mixed astigmatism. Vision with glasses 6/6. The father of the patient reports trauma at the time of delivery, which was by forceps.

I have been fortunate to receive from Dr. F. W. Marlowe of Syracuse, New York, a report on this left eye as noted

ten to between three and four o'clock. Its upper nasal end extends to the limbus and at that place is two mm. wide. Over the pupillary area it is three mm. wide. Toward the temporal side it is less dense and in part appears as a broad diffuse opacity. Three or four hair-like lines are also seen in this periphery, but only after full dilatation of the pupil, because of the brown iris. The slit-lamp and corneal microscope show these bands to be situated on the posterior corneal surface. For a short distance the middle one is suspended in the aqueous, being about one and one-half times the corneal thickness away from it. In part both become entirely detached and are thus found suspended in the anterior chamber. The fiber

direction is nearly vertical. These bands are no doubt due to an extensive detachment of Descemet's membrane. There is some connective tissue formation, and the development of other "glass fibers" from the rolling up of the edge of Descemet's.

It has come to my notice that Dr. R. Von der Heydt of Chicago has recently seen an eye presenting a somewhat similar birth injury in a boy now thirteen years old. There is a history of a "black eye" lasting a month after forceps delivery. The several diagonal glassy ridges are in contact with the posterior surface of the cornea in their entire length, and may be beautifully seen in the accompanying stereophotograph.

Serial sections of an eye presenting a birth trauma were first made by Peters of Rostock. The child was delivered by forceps, and the eye showed marked changes. Two vertical opaque lines adjacent to a clear zone were seen in the deeper corneal strata. The four mm. wide central clear band became more opaque, and at the time of death (thirty-seventh day) it was thickened and showed opaque flocculi.

Peters' interpretation of the salient points of development was that the bulb was pressed against the upper orbital wall, the horizontal meridian being elongated and vertical fracture of Descemet's and the corneal tissue resulting.

In this case Descemet's membrane was so torn as to form four thin vertical bands. As the pressure was again released the torn membranes were extended and detached from their underlying bases. These then formed the vertical strips free in the anterior chamber, with a continuous attachment above and below.

Ruptures of Descemet's membrane now so beautifully observable by slit-lamp and corneal inspection were first diagnosed by O. Haab in Zurich in 1891. They were seen best in cases of hydrophthalmus, because of the relatively normal condition of the cornea through which they had to be observed. If Descemet's membrane ruptures in advanced cases of keratoconus,

these ruptures may also be studied if they extend beyond the central cloudy area. When Descemet's membrane ruptures the margins separate widely. The aqueous undermines the edges, and they, with their endothelial covering, become separated from the substantia propria. The edges roll up and the intervening bare space is soon covered by an amorphous endothelium. This process has been described by Vogt in his atlas of slit-lamp microscopy (1921).

In 1920 Axenfeld described a peculiar ring opacity in the corneal limbus at some distance from its margin. This he called "Embryotoxon corneae posterius". It should not be confused with the well known embryotoxon situated in the stroma of the cornea. It is a circular whitish line in the plane of Descemet's membrane, and its edge somewhat resembles the margin of a rupture of Descemet.

Virchow in volume one of the second edition of the Graefe-Saemisch Handbook probably made the first mention of this condition in describing the case of a woman eighty-two years old. He saw a flat broad smooth thickening of the edge of Descemet's membrane.

These cases cannot be so rare, as I have found a somewhat similar condition in three patients. A prominent reflecting ridge, nearly circular and adjacent to Descemet's membrane at the limbus, was seen in a lady of sixty-seven years of age. The upper part could not be followed because of the loss of transparency due to gerontoxon. Similar more or less completely circular ridges or parts of ridges were seen in two younger patients. These eyes showed no other pathology.

The proper use of the slit-lamp and corneal microscope, especially by narrowing of the beam, has greatly simplified the study of these corneal cases. We can be certain of our localization and observations. There is no more excuse for the confusion which has existed in the literature of the past pertaining to these various interesting evidences of ocular pathology.

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REFLECTION ILLUMINATOR FOR PERIMETRIC STUDIES OF BEDRIDDEN PATIENTS

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The author describes an arrangement by which a combination of the Lloyd slate and the Peter campimeter may be applied to perimetric study of a bedridden patient, excellent illumination being obtained from a lamp placed within an inverted wire basket upon which rests the patient's head.

A patient recently presented himself with symptoms suggestive of a brain tumor. In the course of the study his blind spots were mapped (monocularly) on the Lloyd stereocampimeter. The evidence was such as to necessitate hospitalization. It was desirable to record the effect on his blind spot after he had received treatment, but it was not practical to use the Lloyd stereocampimeter with the patient su-

pine and he could not be elevated because of a lumbar puncture headache. A black chart¹ as supplied with the

¹The black charts are supplied on order for the stereocampimeter. They consist of a dull black paper on which the design in degrees is imprinted in gray, being a counterpart of the blackboard slate supplied with the instrument. This, therefore, permits filing as a record of the actual plotting as suggested by the writer in the A.J.O., 1924, vol. 7, Sept., no. 9.

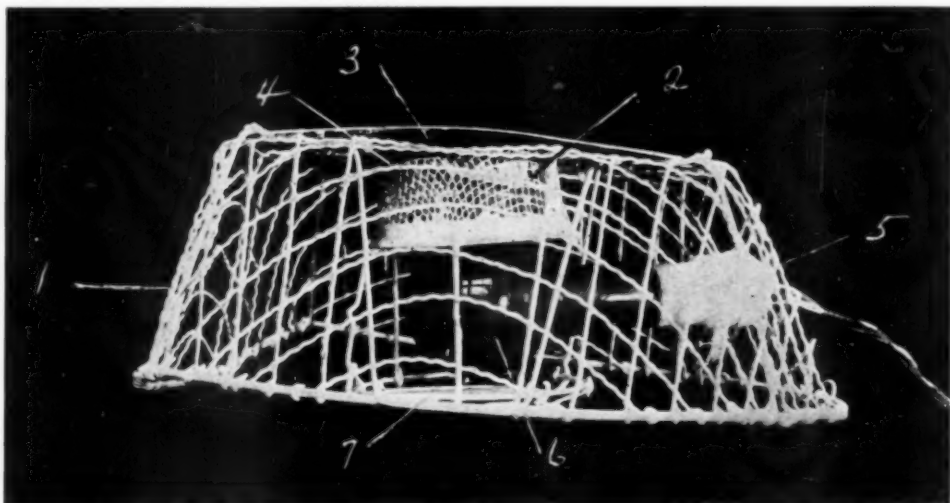


Fig. 1 (Evans). Showing arrangement of wire basket and lamp as used for reflection illuminator in perimetric studies of bedridden patients.

1. Basket.
2. Strainer.
3. Sheet iron.
4. Asbestos lining.
5. Socket.
6. Bulb.
7. Asbestos.
8. High base curve punktal lens.
9. The reversed Peter campimeter. Peter's diagram, being on the opposite side, is still useful when remounted to face the patient. The difference in the length of the fixation line produces a slight error.
10. Lloyd's slate. This is ordinarily supplied with the stereocampimeter and is a heavy dull black paper. When removed from this device it can be filed directly as the record without the usual inconvenience of copying on a small diagram.
11. Small spring clips to hold Lloyd slate.
12. Wire-loop intermediate sight to insure satisfactory fixation.

Lloyd stereocampimeter was therefore applied to the reverse side of the Peter campimeter and held in position by small metal clips. The fixation line was altered to 190 mm. by bending the metal rest of the Peter instrument, and

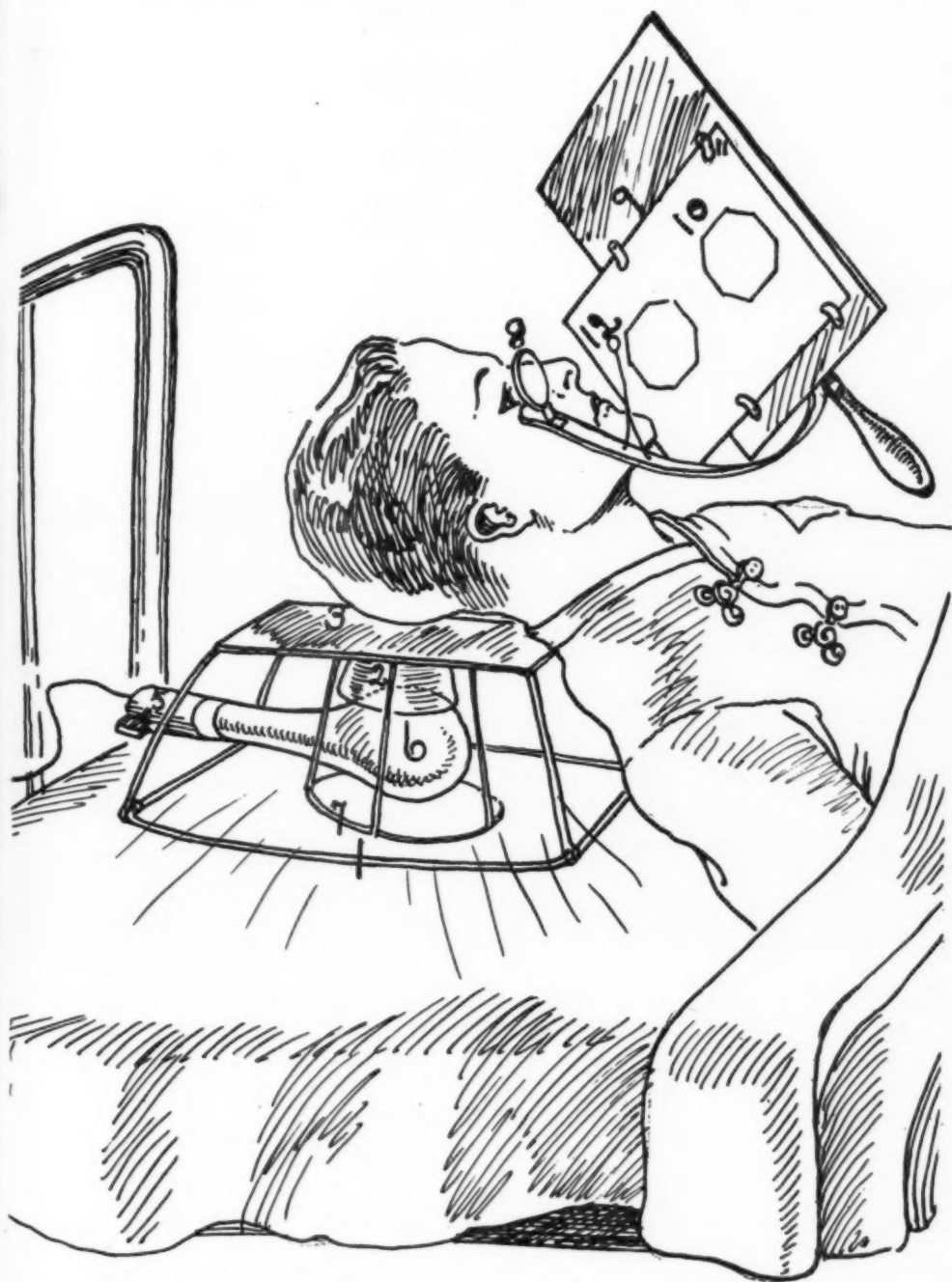


Fig. 2 (Evans). Showing illuminator and combination Lloyd slate and Peter campimeter in use. The campimeter is shown in a distorted position to demonstrate the relations more clearly. The corresponding parts bear the same numbers in figures 1 and 2.

the patient was supplied with a large correcting lens of $+5.25$ diopters strength to correspond to that of the Lloyd stereocampimeter, so that he would not have to accommodate for fixation. A small ring was also mounted in an intermediate position between the patient's eye and the surface of the chart, so that perfect fixation was encouraged. This use of the stereocampimeter slate on the Peter instrument requires that the device be used with one eye only.

With the patient lying in bed on his back the surface of the chart was poorly and unevenly illuminated. A light held to one side or the other not only did not overcome these difficulties but also was visible to him in his peripheral field. The following illuminator was therefore designed.

Description: A round wire basket was procured, 140 mm. deep, with a flat bottom measuring about 370 mm. in diameter. (This may be had in the household supply stores and is used as a basket to hold dishes while draining. The particular one here used was provided with a small strainer suspended at the center of the large basket and designed to hold silverware while draining.) A piece of sheet iron about 200 mm. square was attached to the outside of the bottom of the basket,

being previously lined with asbestos. Entering from the side wall of the basket an electric light socket was attached so that when a bulb (100 W., "daylight, ground") was inserted it occupied the center of the basket. Another sheet of asbestos was attached in such a way as to shield the bulb on its side opposite the sheet iron shield, so as to protect the bedding from the radiated heat.

Technique of use: The patient's pillow being removed, the illuminator as above described was placed under his head with the bottom of the basket up, so that the patient's occiput occupied the center of the sheet iron shield. When the light was turned on, his peripheral field was not exposed to direct rays from the electric light bulb, but the strong light reflected upward from the bed sheets illuminated the surface of the campimeter uniformly with an intensity of between fifteen and twenty foot candles. This device works equally well with the Schwigger hand perimeter. If it is desirable for the patient to sit up during the examination, a sheet may be draped over the head of the bed or nearby wall to act as a reflector for the "illuminator" which is hung against it in the same relation as when the patient is reclining.

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OPHTHALMIC PATHOLOGY

Report of the Section on Ophthalmic Pathology of the Army Medical Museum*

GEORGE R. CALLENDER, M.D.

and

HELENOR CAMPBELL

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This report explains the methods used in the Army Medical Museum for preservation, sectioning, staining, mounting, and recording pathological eye specimens, and makes an appeal for additional material, especially such as may be obtained post mortem.

Since the first report,¹ in 1923, of the section on ophthalmic pathology at the Army Medical Museum, over two thousand items have been added to the collection, which now consists of about 2,600 drawings, photographs, lantern slides, models, historical documents, microscopic slides, and pathological specimens. Of these 822 are eye specimens sent in for diagnosis by ophthalmologists throughout the country. Over 1,000 photomicrographs have been made of these specimens and used in the exhibition or sent to contributors for teaching or illustrating. There have been 164 contributors to the collection. The display of this material occupies 1,182 square feet, 788 of which are devoted to the Ball collection. Exhibits of ophthalmic pathology were sent to the meetings of the American Academy of Ophthalmology and Otolaryngology in Minneapolis in 1922, in Montreal in 1924, and in Detroit in 1927; to the meeting of the International Association of Medical Museums in Boston in 1923; to the Convention of English Speaking Ophthalmological Societies in London in 1925; and to the Colorado State Medical Society meeting in Colorado Springs in 1927.

The arrangement with the cooperating societies provides that any member sending an eye to the Museum shall receive a diagnosis and, if desired, a section of his specimen. A contrib-

utor, on request, may obtain a print of any photomicrograph taken of his specimen for the Museum collection. Diagnoses are made by a committee representing the American Academy of Ophthalmology and Otolaryngology, the American Ophthalmological Society, the Section on Ophthalmology of the American Medical Association, and the Army Medical Museum.

A questionnaire has been prepared under the direction of the committee, and copies are sent to contributors on all cases in which the subsequent histories are significant. It is hoped that the cooperation of the contributors in this method of following up cases will result in the accumulation of much interesting and valuable information.

There are now in the Museum one hundred and sixty eye specimens available for exchange. Practically all of the specimens received are from operations, so the collection is deficient in pathological material from disease conditions which do not lead to enucleation. The donation of specimens of this character, usually obtainable only at necropsy, is solicited.

To secure necropsy specimens, the following method has been found satisfactory. As post mortem changes appear in the eye within six to eight hours, about 0.25 c. c. of concentrated formalin (forty per cent formaldehyde) is injected into the vitreous at the beginning of the necropsy or, when possible, immediately after death. The injection is made with a fine needle passing through the equator of the eyeball on the temporal side. When this is done, the posterior segment can be removed, after breaking through the roof of the orbit, without disfiguring

* Collection maintained under the auspices and with the cooperation of the American Academy of Ophthalmology and Otolaryngology, the American Ophthalmological Society and the Section on Ophthalmology of the American Medical Association. Published with the approval of the joint committee of these three organizations.

the body and without detaching the retina. Bouin's fluid is used as a fixative in these cases to prevent wrinkling of the retina.

Contributors are requested to fix their surgical specimens, unopened, in ten per cent formalin (four per cent formaldehyde) and to send them to the Museum in this solution, accompanied by complete histories. It is advisable to pack the eyes in absorbent cotton in bottles well filled with the fixing fluid, as this insures them against drying in case of leakage. Specimens should be addressed to the Curator, Army Medical Museum, Washington, D.C.

Preliminary steps in the preparation of eye specimens.

The approximate time for the routine preparation of an eye by the celloidin method is two months. Where it is important to ascertain the character of a tumor and whether or not it is metastasizing to the optic nerve, a section of the growth and a cross section of the nerve are made in paraffin and a preliminary report of the findings sent to the contributor.

Whole eyes received in ten per cent formalin are washed in running water for three to six hours, placed for twelve to twenty-four hours in one per cent hydrochloric acid in fifty per cent alcohol to prevent separation of the retina,² in sixty per cent alcohol for twelve to twenty-four hours, and in eighty per cent alcohol for twenty-four hours or longer. They are then transilluminated and cut with a safety razor blade or sharp brain knife. To prevent dislocation of the lens the eye is placed, cornea down, on a cork and cut from the optic nerve forward.

If a gross specimen is desired the eye is bisected through one side of the optic nerve and the edge of the pupil. The side containing the central vessels of the optic nerve and the greater part of the pupil is embedded for sectioning. The smaller piece is preserved for its gross pathology. In cases where a gross specimen is not satisfactory in demonstrating the pathological condition, or where this method of cutting

the eye would spoil the microscopic section, a cut is made on each side of the optic nerve to just within the limbus. This allows impregnation of the anterior chamber and leaves the lens in position.

If a tumor, injury, or other lesion is indicated by the history, or revealed by transillumination or external examination, the eye is cut to include it in the section. Otherwise the eye is cut in a horizontal plane. Where the surgeon has removed a sufficient amount (not less than two mm.) of the optic nerve it is severed just behind the disc and embedded in a vertical position with the eye. This gives a longitudinal and a cross section of the nerve in the same microscopic preparation.

Decalcification

If calcium or bone is found when the eye is bisected, the block to be sectioned is washed to remove the alcohol, and suspended in equal parts of ten per cent formalin and formic acid (full strength) in a dim light for one to three days. It is then suspended in ten per cent formalin over magnesium carbonate until it is neutral to litmus paper (about twenty-four hours), washed, placed in eighty per cent alcohol. After this step the method of dehydrating and embedding proceeds as with undecalcified eyes.

Dehydrating and Embedding

After cutting, the eyes, which have been in eighty per cent alcohol, are transferred to ninety-five per cent alcohol for twenty-four hours and the method continued as follows:

absolute alcohol (two changes)
 twenty-four hours
 absolute alcohol and ether (equal parts) 12 to 24 hours
 4 per cent celloidin (Dupont's "Parlodion," washed and thoroughly dried, has been found satisfactory) in equal parts of absolute alcohol and ether 1 week
 8 per cent celloidin 1 week
 12 per cent celloidin 1 week

The eyes are then placed in Stender dishes in the thick celloidin, which is

allowed to evaporate slowly. When the celloidin becomes firm, which requires three or four days, it is covered with eighty per cent alcohol plus ten per cent chloroform for twenty-four hours. At the end of this time the embedded specimens are removed from the dish and affixed to fiber blocks. This is accomplished by removing the excess alcohol from the celloidin blocks, placing them for about one minute in four per cent celloidin, and then transferring them to the fiber. When the four per cent celloidin becomes firm, the mounted blocks are placed upright in a dish of eighty per cent alcohol, where they are allowed to remain for twenty-four hours before cutting.

Sectioning

In sectioning an eye an endeavor is made to include in one plane the pupil, the disc, a longitudinal section of the central vessels of the optic nerve, a cross section of the optic nerve, and whatever pathology or trauma is indicated by the history or macroscopic examination. When this is not possible, sections are made at the necessary levels, and a section from each plane, after staining, is mounted on one slide. Frequently the macula is difficult to find without serial sectioning, and an effort is made to obtain a section of it only when this is considered important.

Sections are made at about twenty-five microns. This is thicker than sections prepared by the paraffin and dry celloidin³ methods, but there is very little shrinkage, the lens remains in situ, and it is possible to obtain sections of an entire eye with minimum distortion of any of its structures.

The sections, when cut, are floated on water and drawn up on squares of thin white paper. These are piled, rolled, tied, and tagged with the specimen number, and placed in eighty per cent alcohol until ready for staining.

Staining

The sections are taken out of eighty per cent alcohol, floated on water, stained in alum hematoxylin, washed in water, differentiated in acid alcohol

(one per cent hydrochloric acid in seventy per cent alcohol), rinsed in water, placed in ninety-five per cent alcohol until all color is removed from the celloidin, washed in tap water until blue, counterstained in eosin (one per cent water-soluble in seventy per cent alcohol), dehydrated in ninety-five per cent alcohol and then in absolute alcohol with ten drops of chloroform added to each fifty c. c. to prevent dissolving of the celloidin, cleared in a solution of bergamot oil, two parts with cedar oil, two parts and phenol one part, and transferred to bergamot oil.

Mounting

Sections are mounted in balsam or gum damar on three by two inch microscopic slides, using 35 by 50 mm., 43 by 50 mm., or 43 by 70 mm. cover glasses. Permanent labelling is insured by mounting under the cover glass a slip of paper on which the specimen number has been written in India ink.

Lantern Slides

Lantern slides are made by mounting sections as above, except that 4 by 3¼ inch lantern slide cover glasses are substituted for the 3 by 2 inch microscopic slides. When the balsam is thoroughly dried, which requires several months, the lantern slides are prepared like photographic lantern slides, but using MacCallum stereopticon slide frames (George H. Wahmann Manufacturing Company, 520 West Baltimore Street, Baltimore, Maryland), to prevent pressure on the mounts.

Preservation of tissue

Unstained sections and celloidin blocks can be kept indefinitely in eighty per cent alcohol. For the best preservation of the staining qualities of the tissue Verhoeff advises that 0.05 per cent water-soluble eosin be added to the alcohol.⁴

Gross specimens

After the eye has been cut, the gross specimen in eighty per cent alcohol is washed in water until it sinks to the

bottom of the container, when it is ready for mounting.

Sheet rubber one millimeter thick (American Hard Rubber Company, 11 Mercer Street, New York) is softened in a flame and cut to fit the jar in which the specimen is to be mounted. This rubber mat is heated again, and a hole a little smaller than the greatest circumference of the eye is cut in it. The specimen fits into this hole but cannot fall through it. The mat is braced against the front of the jar with bent strips of the rubber, and the jar is filled with Kaiserling III. The original formula is used for this solution except that, to prevent the growth of molds, four per cent of sodium arsenate is added to the water used in its preparation. It is advisable to allow the jar to stand for twenty-four hours before sealing, in order that any air bubbles which may have accumulated in or around the specimen may be removed. The jars are sealed with a hot mixture of asphaltum, ninety-five per cent, and paraffin, 52° C., five per cent. When this is cooled they are shellacked around the top to prevent the paint from dissolving the sealing mixture, and are painted over the top, back and sides with flat black, followed by automobile enamel. A stencil of the caption is made in pin-point type on wax paper. This is placed against the front of the jar below the eye and brushed over with Jaenecke-Ault Company's white printing ink. When the

caption dries it is covered with varnish to prevent blurring.

Photography

Wet specimens of eyes are photographed with a 75 mm. lens attached to a Bausch and Lomb cone adapter and prism fitted to an ordinary photomicrographic camera. Illumination is by an arc light at an angle of about 45°. The specimens are photographed under eighty per cent alcohol. If water is used for this purpose bubbles gather on the surface of the specimen and appear in the negative. Photographs of entire eye sections are taken with a 75 mm. lens without an ocular. Photomicrography of the eye in the higher magnifications does not differ from the photomicrography of other tissues.

Display

For the display of mounted sections a hole is cut in white mat board three millimeters thick, large enough for a three by two inch slide and backed with a white card. The slide is held in place by black passe-partout tape. Photomicrographs of the specimen and a caption are attached to the same board with dry mounting tissue.

The entire collection of ophthalmic pathology is available for study at the Army Medical Museum from 9 to 4:30 every day, except Sundays and holidays.

Army Medical Museum

References

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- ³ Lee, Arthur B., *The Microtome's Vade-mecum*, 8th edition, pp. 104-105, P. Blakiston's Son and Co., Philadelphia.

SERUM DISEASE AND SERUM ACCIDENTS

FREDERICK T. LORD, M.D.

BOSTON

The risk involved in the therapeutic use of horse serum is illustrated by a fatal case, seen in consultation, and in which the patient had been given 20,000 units of diphtheria antitoxin on three occasions within four days. There was no history of hay fever or asthma. Skin tests for hypersensitiveness to horse serum were negative. The paper was presented, by invitation, at the meeting of the New England Ophthalmological Society, December 20, 1927, on account of several accidents which had occurred in using diphtheria antitoxin in the treatment of eye cases.

Antiserum used in treatment is almost invariably derived from the horse and was first extensively used after the discovery of diphtheria antitoxin in 1891. Serum treatment has steadily increased and is now employed also against tetanus, meningococcus infection, lobar pneumonia, scarlet fever, erysipelas, and anthrax. Recently it has become an almost universal practice to immunize young children against diphtheria by the use of toxin-antitoxin mixture, which contains a small amount of horse serum.

It should be appreciated that the resulting passive immunity is specific and obtains only against the particular substance with which the horse is immunized. There is no evidence, for example, that serum containing diphtheria antitoxin is in any way effective against any other infection than that due to the diphtheria bacillus. From this point of view, it is unlikely that the use of diphtheria antitoxin in the treatment of eye conditions other than those due to diphtheria will prove of value.

In certain cases disturbing reactions from horse serum are to be expected, but ordinarily the reactions are not sufficiently dangerous to deter us from using the serum in cases in which there is good ground for the belief that it may be beneficial. I have, myself, used antiserum against type one of pneumococcus pneumonia in many cases and have not seen any serious ill effects. Park estimates that the development of rapid and feeble pulse, nausea, and a feeling of suffocation within a few minutes occurs once in every thousand and death once in seventy thousand injections. The chances of ill effects vary somewhat with the character of

the material. Antitetanus serum and antitoxic serum against diphtheria are refined products and are somewhat less dangerous than other sera. The hazard is greater with intravenous and intraspinal than with subcutaneous and intramuscular injections.

The most serious reaction, a form of shock, after serum injection represents an increased susceptibility to the substances contained in the serum, quite apart from its immune principles. This shocklike reaction may well be illustrated by the subcutaneous or intraperitoneal injection of a guinea pig with a small dose of horse serum following which the animal remains well, whereas on intravenous reinoculation with one cubic centimeter of horse serum after an interval of twelve to fourteen days, the animal dies within a few minutes with symptoms of respiratory failure. The lungs become greatly distended, and so remain even after removal from the body of the animal. Analogous reactions occur in man. At times within a few minutes, usually ten, after the injection of a large or small dose of horse serum into a susceptible individual there may be itching of the skin, tendency to rub the extremities together or against the bed clothes, sneezing, cough, wheezing as in an attack of asthma, dyspnea, a choking sensation, and cyanosis. Convulsions may occur, and a death may follow within from ten minutes to several hours.

There are three groups of hypersensitive persons. In one the increased susceptibility, as in the animal experiment, is induced by a previous injection of serum, and becomes manifest after an interval of about ten days following the last injection. The danger

of severe and fatal reactions is less with artificially induced than with spontaneous hypersensitiveness, and diminishes with the lapse of time following the initial injection. Of Lamson's forty-one cases in which a fatal outcome was apparently associated with the injection of foreign protein, a previous injection had been given in eight cases.

The prevailing practice of immunizing all young children against diphtheria by means of the toxin-antitoxin mixture raises an important question regarding the extent to which such a procedure may induce hypersensitiveness, with consequent danger of a severe reaction, if later it becomes necessary to use horse serum in prevention or treatment.

The observations of Hooker indicate that, as a result of the injection of toxin-antitoxin, twenty-seven per cent of adults previously yielding a negative skin test to horse serum become positive; and Park has shown that a higher percentage of reactions to the intracutaneous test with horse serum or globulin occurs among those previously injected with toxin-antitoxin than among untreated persons. The allergic state is less marked after small than after large doses, but once produced may persist for at least seventeen years (Hooker) and probably throughout life. In view, however, of the large number of children who are rendered hypersensitive by the toxin-antitoxin, and in view of the likelihood that among them there will occur illnesses against which it will be desirable to use antiserum derived from the horse, it would seem best to make toxin-antitoxin mixture with goat rather than horse serum, or to accomplish immunization with toxoid.

Spontaneous hypersusceptibility to horse serum obtains especially in the subjects of hay fever and asthma, particularly those in whom attacks are excited by proximity to horses. Of the forty-one fatal cases in Lamson's series fourteen gave a history of asthma or hay fever. The danger of serum treatment in spontaneously hypersensitive persons must be greater than the number of reported instances

indicates, as nine deaths and one collapse following injection of diphtheria antitoxin in patients with asthma have been brought to my attention.

The third group comprises persons who have never had hay fever, asthma, or a previous injection of serum, but who nevertheless are hypersensitive, as shown by positive skin tests. Previous estimates indicate that from 3 to 10 per cent of all persons are skin-sensitive to horse serum. The practice of immunizing children with toxin-antitoxin mixture will greatly increase this proportion, and only the future can tell what will be the results of therapeutic administration of horse serum in this group.

The development of serum disease depends on the amount of serum used. After less than ten c. c. about 10 per cent have symptoms. After one hundred c. c. or more probably only about 10 per cent escape. The symptoms usually begin a week or later after the last dose and continue from a few days to several weeks. Urticaria, erythema, edema of the skin, stiff and painful joints, fever, and enlargement of the glands and spleen accompany the attack. Serum disease is troublesome but was hitherto thought not to be dangerous. The experience reported tonight* is of extreme importance in this connection, because of the fatal outcome. The patient, whom I saw in consultation, had no history of hay fever or asthma. He had been given 20,000 units of diphtheria antitoxin on three occasions within four days, and seven days after the first injection developed general itching, erythema, urticaria, vesicles, bullæ, purpura, ulceration of the soft palate and uvula, bleeding gums, arthritis, and fever. A large gland was felt at the right side of the neck near the angle of the jaw. The inguinal glands were slightly enlarged. Bronchopneumonia developed, and he died on the sixteenth day after the first injection. No autopsy was obtained. The intensity of the skin disturbance in this patient was of unusual severity.

* See page 310 of this Journal in the present volume.

Preliminary skin tests for hypersensitivity to horse serum had been negative.

In a few instances recorded in the literature, post-mortem examination after sudden death following serum injection has shown enlargement of the thymus.

When the therapeutic use of horse serum is under consideration, inquiry should be made regarding a history of hay fever, asthma, or a previous injection of serum. An affirmative reply places the patient in the class of those to whom horse serum may be dangerous. If more than a week has elapsed since the last injection of serum a patient originally insensitive may have become hypersensitive. Serum injections are apparently hazardous in children with enlarged thymus.

In estimating the danger, absolute reliance can not be placed on the results of skin tests for hypersensitivity, but in general it can be said that the hazard is increased in the presence of positive reactions and is greater the more intense the reaction. But severe and even fatal reactions have rarely occurred when skin tests have been negative.

On the whole, the danger from horse serum cannot be regarded as great when we consider the enormous number of cases in which it has been used without accident for prevention and treatment of diphtheria. Park considers that an immediate intravenous injection is justified in every severe case of diphtheria without waiting for

the result of an intracutaneous test, unless there is evidence of status lymphaticus or a history of asthma. When the circumstances are such, however, as to warrant delay, a test of skin sensitiveness should be performed before the administration of serum.

A positive skin test alone does not constitute a contraindication to the use of serum when there is sufficient ground for belief in its therapeutic value to justify taking some risk, but a positive test does make it desirable to proceed cautiously in the administration and to give the first injection subcutaneously or intramuscularly rather than intravenously. Under all circumstances, intravenous injections should be given slowly, spending about ten minutes in giving the first ten c. c. In patients with a history of hay fever, asthma, or a previous injection of serum for prevention or treatment, and in those with marked skin hypersensitivity, it is desirable to start the injections subcutaneously with from 0.005 to 0.025 c. c., doubling the dose every half hour until 1 c.c. has been given, and then if intravenous injections are to be given to start with 0.1 c. c. diluted with normal saline and again to double the dose every half hour until the desired amount is reached. The injection should be immediately stopped at the first appearance of symptoms and ten minims of 1 to 1000 solution of adrenalin and 1/60 to 1/30 grain of atropine given subcutaneously.

305 Beacon street.

IRIDOSCHISIS

CARL HOBART, M.D.
SAINT LOUIS

* The literature of iridoschisis, or coloboma of the iris, is carefully reviewed, and the embryology of the condition is discussed. The author's case presented an atypical form of the anomaly in one eye and a typical coloboma in the other.

A case of congenital iridoschisis is here reported. This anomaly has been present since birth, as a typical and an atypical coloboma of the iris, with no visible coloboma of the choroid, ciliary body, or lens.

The term "iridoschisis" is in recent use to designate a cleft iris, which deformity is usually associated with other acquired or congenital defects. The term "coloboma" was introduced by Walther (1821) to indicate certain congenital defects of characteristic appearance and situation. Bartholinus (1673) first described and figured a coloboma of the iris. The next observation was made by Albinus (1764). The early bibliography will be found in a book by Karl Himly (1830). Gescheidt (1831) and Heyfelder (1834) demonstrated that coloboma of the iris might be hereditary. They found this anomaly in three sisters, and in two and three generations.

Various hypotheses have been advanced to account for developmental defects of the iris. The earliest theory is that of Ammon, who thought that the cleft in the iris was due to failure of the choroidal fissure of the embryonic eye to close. To this De Lapersonne objected that the fetal fissure was closed before the rudiments of the iris appeared. This objection might be met by postulating an abnormal delay of closure. However, the theory does not account for the indisputable clinical fact that clefts of the iris may occur in any part of its circumference, and that more than one cleft may be present in the same eye.

Vossius revived this theory, with the added assumption that rotation of the developing eye occurred through an angle of ninety degrees or more, which would thus account for the presence of a cleft in any typical situation, but failed to explain multiple clefts. This assumption has been discredited

by the work of many embryologists, notably Deyl and Dedekind, who have shown that no such rotation of the eyeball occurs.

Deutschmann and Van Duyse contend that congenital defects of the iris are too various to be due to embryologic causes. According to their views all such defects are the result of intrauterine inflammation. The facts in support of this theory are few, yet one must admit that intrauterine inflammation does occur, usually of syphilitic origin, but there is no evidence that a higher percentage of hereditary syphilis prevails among the subjects of coloboma iridis than among the general population.

Coloboma of the iris has been examined most exhaustively with the microscope by Bock. The retinal pigment epithelium of the coloboma is of normal thickness peripherally, but much thickened and nodular in its central portion. Clinically, the retinal pigment epithelium is manifestly overdeveloped at the margin of the coloboma. The sphincter may be absent or much attenuated. Abnormally profuse development of vessels is to be observed centrally, as well as nodular aggregations of round cells.

A meridional section in a partial coloboma shows a triangular depression of the anterior surface with projections or depressions of the posterior surface. Between the pillars are bridges of connective tissue differing from the iris stroma. They may arise from a persistent pupillary membrane at the lesser arterial circle, from the edges of the coloboma, or from the projecting masses of pigment. In some cases a fibrous strand stretches from the papilla or its vicinity forward to the equator of the lens, to be attached to the apex of the coloboma.

In coloboma of the iris, the pupil is often displaced due to the pull of the

sphincter fibers in the pillars. In partial iridoschisis, there extends downward the pigmented line or streak which represents the continuation of the defect, the streak being situated on the posterior surface of the iris, and thus distinguished from a melanoma. Two colobomata in one eye are extremely rare. Zimmermann reported an atypical coloboma where the entire lower half of the iris was missing. Concomitant colobomata in other parts of the eye are sometimes observed.

Colobomata of the iris may occur anywhere in its circumference, and are classified as typical and atypical. Typical coloboma of the iris is the more common abnormality. The usual form is that of a gothic arch with the apex down so that the peripheral part is narrower than the pupillary. It is generally unilateral and most often on the left side. There may be an associated coloboma of the choroid and ciliary body, and sometimes the lens also is affected. This form of coloboma is regarded as a residuum of the fetal cleft.

The relative frequency of the various positions assumed by iridic colobomata is shown in the following tables compiled from one hundred and four cases quoted or observed by Bock and Manz:

Inward, 25 or 24.03 per cent
Downward, 22 or 21.15 per cent
Outward, 20 or 19.23 per cent
Upward, 12 or 11.53 per cent
Upward and inward, 13 or 12.53 per cent
Upward and outward, 12 or 11.53 per cent.

The most usual situations for a cleft in the iris are thus inward, downward, and outward. These three types occur with almost equal frequency. Single clefts are most common. Multiple clefts do occur, however, and Dubois has recorded a case with as many as sixteen.

Atypical colobomata may involve a quarter or a half of the iris, or be a mere indentation of the pupillary margin. In most partial colobomata the hiatus is continued downward as a pigmented streak or furrow. The

pigment can be distinguished from a melanoma by its situation beneath the surface of the iris. There may be, however, a deficiency of the retinal pigment or stroma, or there may be a heterochromia.

Atypical colobomata usually involve only the iris; they may include the ciliary body, but very rarely reach the choroid. Mittelstadt, Reuss, and Hess have observed typical downward coloboma of the choroid associated with atypical coloboma of the iris.

It is fairly common, especially in the atypical colobomata, to find tags of persistent pupillary membrane. Bock and Plange believe that there is some connection between coloboma of the iris, polycoria, and persistent pupillary membrane. Plange states that colobomata of the iris are found in 42.9 per cent of the cases of persistent pupillary membrane. There are often multiple pupils (polycoria), sometimes called accessory pupils, but never provided with sphincter muscles, and hence not true pupils.

Zonular fibers are attached to the anterior capsule in bundles of seven or more and become confluent with the capsule in different regions. When healthy, the fibers are free from pigmented ovals, while in disease these ovals are attached at various angles to the individual fibers. When congenital coloboma of the iris and lens occurs, or in congenital notching of the lens, there is an absence of these zonular fibers from the notched area.

Vitreous prolapse may occur even if the zonular fibers seem intact, as in the case of a patient with traumatic prolapse of the iris, which was excised, the resulting coloboma having a sharp margin. According to a report presented to the American Ophthalmological Society meeting of 1925, the right eye of a man of thirty-two years presented a congenital coloboma of the lower portion of the iris. On the capsule there were countless pigment stars arranged in uneven rows near the inferior temporal pupillary margin, and an opacity of the anterior capsule and reduplication of opaque lamellæ through the center of the lens.

Some zonular fibers were observed at the lower margin of the lens in the colobomatous zone, with fine pigmented ovals attached. The left eye presented incomplete coloboma on the lower outer side, with some central lens opacity, and many pigmented masses on the anterior capsule. Zonular fibers were traced from three ciliary processes near the margin of the colobomatous zone, and fibers were found to extend on to the anterior capsule. In congenital coloboma, however, many zonular fibers stretch from the ciliary processes to a mass of exudate on the wrinkled anterior capsule.

Tags of persistent pupillary membrane associated with colobomata are comprehensible as the expression of a general retardation in the disappearance of the embryonic mesoderm. Places where the iridohyaloid vessels are most marked correspond with the most common sites of coloboma, namely downward in the lines of the cleft, inward and outward in the region of the anterior ends of the long ciliary vessels. Any of the other vessels might persist, either singly or in several places, giving rise to single or multiple atypical colobomata. If all the vessels persisted the iris would be short and thick—a condition of apparent aniridia. Therefore persistence of these iridohyaloid vessels is the probable cause of coloboma, and affords a single and satisfactory explanation for the occurrence of typical, atypical, and multiple colobomata iridis, as well as of polycoria, persistent pupillary membrane, and aniridia.

John F. Townsend, of Charleston, South Carolina, (1924) reviews the various explanations of iris defects of this nature, first glancing at comparative anatomy, and then touching on the work of de Schweinitz in 1884 and of Posey in 1898, who stated that the iris was developed in segments rather than as a circled continuity. In human embryos, four accessory clefts besides that of the normal eye are frequently found, varying from 0.75 to 31.1 mm. in length, and representing different stages of development. If one or more openings do not close, there arise colo-

boma or colobomata of typical or atypical variety, the bridge colobomas being a fusion at one place only of one of these clefts. Townsend regards it as impossible to say whether the pushing in of the mesoderm prevents these clefts from closing, but we know that there is a tendency where such clefts exist for the mesoderm to push in, and for the mesoblastic part of the ciliary process to fill the coloboma space. However, it is impossible to say whether in the lagging development of the iris, the clefts last too long

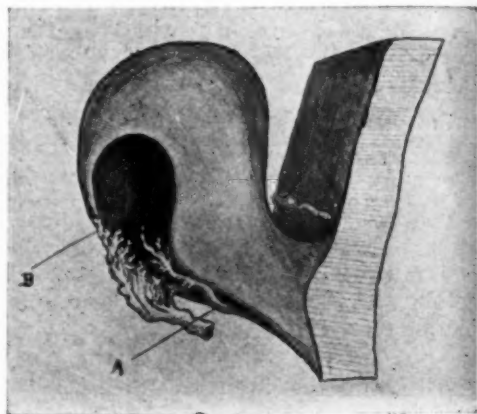


Fig. 1. (From Ida C. Mann, to illustrate paper by Hobart.) Model of human embryo of fourth week. A, hyaloid vessel. B, commencing iridohyaloid vessel.

or are unable to close on account of the undue pushing in of the mesoderm. The inflammation theory of Deutschmann lacks evidence. Undue persistence of bands of vascular fetal membrane may prevent closure of these clefts or holes in the iris.

The main factor in the production of coloboma of the iris appears then to be the abnormally long persistence of one, several, or all of the vessels which normally connect the circulus arteriosus major with the terminal branches of the hyaloid vessels around the edge of the optic cup. These have been called the iridohyaloid vessels. They usually appear about the fifth week of embryonic life and begin to disappear at the middle of the third month, when the ectodermal part of the iris is start-

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ing to grow forward over the front of the lens.

It is obvious that any cause leading to arrested development of the iris at any one point will account for an iridic coloboma, and that the same cause acting simultaneously around the whole circle will account for aniridia.

The existence of coloboma of only the iris stroma can be explained as a failure of one of the anterior branches from the circulus iridis major to develop. This would lead to atrophy of a small sector of the mesodermal iris, the rest of the tissues growing for-

retinal pigment epithelium is overdeveloped at the margin, often projecting beyond it. The sphincter may be absent, spread out, or lost. Profuse development of vessels may be seen in the lower part, as well as nodular aggregations of round cells. Sections of a raphe in partial coloboma show triangular depressions of the surface with projection or depression of the posterior surface.

On histological examination of colobomatous irides we sometimes find an absence of crypts. Near the ciliary border the pillars are thickest, and they are only normally thick at the pupillary border, with pigment often projecting beyond the borders. We sometimes find the sphincter absent, but it is as a rule frayed out and lost near the angle of the coloboma. Connective tissue makes up the bridges, and persistent parts of the pupillary membrane arise from the lesser circle.

Treacher Collins has examined microscopically sections of several cases of congenital coloboma of the iris, and as a result of his observations concludes that the condition might be produced in three possible ways, namely:

(a) by adhesions to the cornea of a persistent fibrovascular sheath of the lens, which thus checks the growth of the iris inward.

(b) by abnormal adhesions of the pupillary membrane to the lens capsule, which in this way hinders the growth of the iris.

(c) by delayed separation of the lens from the back of the cornea.

Usually other peculiarities are present with coloboma of the iris, such as variations in size, form, and curvature of the cornea, opacities in the lens, strabismus, nystagmus, high hyperopia, coloboma of the optic nerve or of the lid, harelip, epibulbar dermoid, microphthalmia, and other abnormalities of the head, trunk, and limbs.

Cases of extreme retraction of the iris due to fetal or infantile inflammation may possibly be mistaken for coloboma iridis. That primary glaucoma can occur in an eye with congenital coloboma of the iris has seemed to offer to some an objection to the

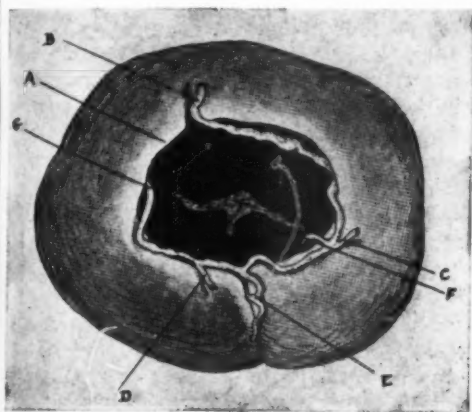


Fig. 2. (From Ida C. Mann, to illustrate paper by Hobart.) Model of human embryo of fifth week. A, gap in circulus arteriosus iridis major. B, C, D, vessels connecting the major circle with the choroid. E, F, G, early iridohyaloid vessels.

ward in the normal manner. Before considering this hypothesis as a correct explanation, one must seek corroborative evidence by examination of cases.

Two questions arise: Firstly, has coloboma of the iris been observed in embryo? If so, it is obviously caused by a persistent iridohyaloid vessel. Secondly, do the microscopic findings in clinical cases of iridic defect bear out this theory?

J. Herbert Parsons states that on microscopic examinations of the iris the edges are found normal in thickness in the upper part but much thickened and nodular in the lower. The

theory which attributes increased tension to blocking of the filtration angle by the root of the iris. But the coloboma cannot be considered as corresponding in any way to a root iridectomy. I should personally consider these eyes predisposed to this disorder, since they are generally very hypermetropic and have less than the normal drainage area. The trabecular tissue constituting the spaces of Fontana may also be absent, and the available space for filtration of the lymph may be smaller than in the normal eye. Consequently the liability to glaucoma should be greater than normally.

If there is a coloboma of the iris and the tension becomes increased, will an iridectomy or trephining relieve the tension?

In a paper on "the production and transmission of certain eye defects," Guyer states that his main work in this direction has been on rabbits, with fowl serum immunized against rabbit lens. In the first experiments the lenses of newly killed young rabbits were pulped thoroughly in a mortar and diluted with normal saline solution, and about four cubic centimeters of this emulsion was then injected intravenously or intraperitoneally into each of the several fowls, four or five times weekly. A week or ten days after the last injection the blood serum of the fowls was ready for use. The rabbits had been so bred as to have their young advanced to about the tenth day of pregnancy, since from the tenth to the thirteenth day of pregnancy seems to be a particularly important period in the development of the lens. From four to seven cubic centimeters of the immunized fowl serum was injected intravenously into the pregnant rabbits at intervals of two or three days, for from ten days to two weeks. Of sixty-one surviving offspring from mothers thus treated, four had one or both eyes conspicuously defective and five others had eyes that were clearly abnormal. The most common abnormality seen both in the original subjects and in their numerous descendants was complete or partial opacity of the lens. Other com-

mon defects which appeared were cleft iris, displacement of the lens, persistent hyaloid artery, microphthalmia, and even almost complete disappearance of the eyeball. The cases of cleft iris or coloboma range all the way from a narrow slit in the lower edge of the iris to a broad wedge or U-shaped opening, which amounts practically to absence of the entire lower part of the iris. The cleft may be confined to the iris or it may extend back deeper into the eye. When one takes into account the early embryology of the eye, it is easy to see how such clefts result from failure of the choroidal fissure to close as it should do normally.

Charles R. Stockard has carried out various experiments showing how chemical and physical means are often experimentally employed to modify development. In fact, the development of an animal embryo in almost any unusual or abnormal environment causes the embryo to respond by deviating from the normal path of development to a degree depending upon the extent of the environmental modification. The same method of treatment does not cause every embryo to respond in a like manner, so that when a number of developing eggs of a given species are subjected to certain chemical stimuli numerous types of defects result. It has been possible, however, to regulate the treatment in certain cases so as to induce a rather definite or consistent response on the part of the embryo.

The developing eggs of two species of fish, when subjected to actions of various magnesium salts, alcohols, or ether, have been found to respond by giving rise to large numbers of cyclopean monsters. This response is oftentimes most consistent, so that sixty in one hundred individuals will be of the cyclopean type. Other defects of the eyes and central nervous system are also caused to occur in these solutions. All of the eye conditions may be interpreted as arising through developmental arrests. The abnormal environment tends to lower the developmental vigor of the embryo, and this lack of

vigor is particularly shown in the condition of the eyes, since the budding off and outpushing of the optic vesicles are apparently the most extensive growth phenomena taking place in the early embryo. The embryos treated with alcohols often had abnormal brains, and, in addition to the cyclopia which was the most frequent eye defect, many were completely eyeless, while others had one eye of the pair fairly well-developed and the opposite eye small and defective or at times entirely absent. Such conditions were termed monophthalmia asymmetrica.

The eggs of the common fowl may be treated with the same substances as those above mentioned. When hens' eggs are placed in an atmosphere saturated with the fumes of alcohol for a short time, from one to three hours, enough fumes penetrate the shell and act on the early embryo to cause it to develop abnormally. The fumes weaken or injure the embryo so that it no longer possesses sufficient developmental energy to give rise to normal fully-formed optic vesicles. Many of the affected chicks show eye conditions similar to those produced in fish.

Further investigations of coloboma of the mesodermal layer of the iris have been made by Jonas S. Friedenwald of Baltimore, who bases his findings on references to Mann (*Trans. Ophth. Soc. United Kingdom*, 1924, p. 161), as well as to a later writer mentioned in the *Zentralblatt für die gesamte Ophthalmologie*, volume 14, p. 348, 1925. He searched for a small localized defect in the pigment layers of the iris at the region of the root where the communicating vessels may have persisted, and found but little evidence of a demonstrable defect, but no refutation of the theory of the development of the coloboma. He discusses a case in a white man of thirty-nine years whose left eye pained, the pupil being egg-shaped, the point downward and extending to the limbus. In the right eye there was a defect in the stroma of the iris, an area in the lower limbus where the pigment layer of the iris was covered only by a thin layer

of connective tissue, trabeculae and crypts being absent. In the center of this lower area was seen a thin vertical pigmented line. A few fine shreds of persistent pupillary membrane were found attached, but not to the colobomatous area.

Thus one eye lacked evidence of inflammation, and its defect was symmetrical, while the other eye had a typical iridoschisis, establishing the congenital nature of this defect beyond a doubt. Although the older theory attributes this trouble to failure in closure of the optic cleft, it is difficult to explain this case on such a basis, for the ectodermal layers show no defects, except as to the development of the pigmented vertical line in the lower iris, as already cited. The more recent theory accounts for the origin of iridoschisis by reference to possible persistence of the vascular connections which exist in the early embryo between the stroma of the iris and the hyaloid system back of the lens; and it regards persistence of these vessels as inhibiting the forward growth of the edge of the optic vesicle, with indentations in this edge. We may find traces of connective tissue in the apex of a coloboma, and at times some fetal distribution of blood vessels, such as the hyaloid artery or pupillary membrane or the ductus arteriosus. A vessel of this sort may have connected the stroma of the iris with the hyaloid system until the growth of the lower limbus, together with the growth of the margin of the optic vesicle on either side of this vessel, finally interrupted this vessel with the resulting formation of a round pupil and the vertical pigmented stripe where the two lips of the optic vesicle had closed in.

Case report

I have had the opportunity to observe and study the following unusual case of coloboma of the iris.

The patient (C. O.) American, aged 33 years, single, came to the City Hospital eye clinic complaining of blurred vision.

Social history: Both parents were circus actors. At the age of six years

he started to learn trapeze walking, and at the age of eight began to perform. He continued with the circus as wire walker and trapeze actor until 1917.



Fig. 3 (Hobart). Right—atypical coloboma of the iris.

General physical examination: The patient is a white male of large frame, but appears somewhat undernourished. He has lues, which infection may have been congenital. The Wassermann is four plus. The heart findings suggest a compensated chronic valvular lesion—probably a mitral insufficiency with some degree of aortitis. Some lung involvement is also present.

Ocular history: The patient complains of blurred vision for the past ten days. There is no history of injury or inflammation, nor of any ocular anomaly in the family.

Ocular examination: O.D. There is an atypical coloboma of the iris extending obliquely across and inward nearly to the ciliary border. The pupil is bordered with a darkly pigmented stripe which also borders the pillars

of the coloboma. The upper and lower extremities of the coloboma are one mm. wide. The widest part is at the center and measures 3.5 mm. The iris is completely absent throughout the



Fig. 4 (Hobart). Left—atypical coloboma of the iris.

extent of the coloboma. A rim of iris about one mm. wide is left at the ciliary border. There is no visible coloboma of the choroid, ciliary body, and lens. O.S. There is a typical pear-shaped coloboma of the iris, extending downward and slightly inward. R. vision 6/40, with +7.00 sph. 6/25. R. reads Jaeger, 2. m. L. vision 6/16, with +3.00 sph. 6/12. L. reads Jaeger 1. m.

Both eyes are microphthalmic, with atrophic iris and peculiar gray striped markings. The patient knows that his iris anomalies have been present since birth. The blurred vision complained of was simply due to asthenopia, and was relieved by correction of his hypermetropia.

626 Metropolitan building

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SYMPATHETIC OPHTHALMIA WITH MYOPIA AS INITIAL SYMPTOM

CHARLES M. SWAB, M.D.

OMAHA

The earliest symptom of this case was the development of a progressive myopia, correction of which yielded normal vision, and which persisted for twelve days before other findings were adequate for diagnosis. Very few similar cases have been recorded. Read (with presentation of patient before the Omaha and Council Bluffs Ophthalmological and Otolaryngological Society, November 16, 1927.

The following case is presented to report an unusual onset of sympathetic uveitis, wherein the earliest symptom was a refractive change in which the vision was correctible to 6/6, and which persisted for twelve days before other findings developed sufficiently to make a diagnosis. From the literature thus far examined, this is the fourth case of sympathetic ophthalmia recorded in which an early myopia was noted. It is the third case in which the temporary refractive change was the outstanding feature of the disease throughout its course.

Case: W. B., white male, age 42 years, employed as clerk in a wholesale fruit house, was first seen the night of September 26, 1926, in consultation with Dr. J. J. Gleeson. While pounding a metal washer with a hammer, the washer had glanced upward, striking him in the right eye. Examination of the right eye, one hour after injury: Questionable perception of light; a small lacerated wound of the skin of the lower lid; laceration of the bulbar conjunctiva at the temporal side; a large laceration of the bulbar conjunctiva on the nasal side which extended horizontally into the cornea for about one-third of its diameter; a prolapse of the iris; anterior chamber collapsed; lens appeared clouded although there was fresh hemorrhage in the pu-

pillary space and a satisfactory study of the lens could not be made.

The patient was taken to St. Joseph's Hospital, where an iridectomy and conjunctival flap operation were done under local anesthesia. Orders for the first forty-eight hours included icebag over the right eye constantly, instillation of one percent atropine twice daily, and large doses of sodium salicylate.

The conjunctival sutures were removed on the fourth postoperative day. As the hood flap was released, the anterior chamber collapsed. At this time, swelling of the lens and laceration of the anterior capsule were noted. A compress bandage was applied and absolute quiet was urged. From its appearance, the eye had no reasonable prospect of function, so I advised enucleation. On the following day, the patient's employer asked Dr. H. Gifford to see the case. At that time the anterior chamber was reformed and light perception was present, so my consultant advised against enucleation. An x-ray examination of the right eye was made, and showed no foreign body in the eye or in the orbit.

The patient was discharged on the ninth postoperative day, with considerable swelling of the lens and marked iridocyclitis. Office records October 9, 15, and 19 show some absorp-

tion of the lens and a continuance of the iridocyclitis. On October 22, (five weeks after injury), the eye presented marked iridocyclitis with subnormal tension, intense photophobia, and lacrimation. Enucleation was again advised and was refused. At this time milk injections were added to the patient's therapeutic regimen.

On November 2, the patient complained of a slight haze of the vision in his good eye. Vision was 6/9 plus 4 without correction, and the eye showed no evidence of pathology. On the following day, vision was 6/60. The near

until that time to submit to the operation. A complete laboratory examination was negative. The myopia persisted but no pathology could be demonstrated, although the pupil was dilated from time to time for study of the media and background. He was discharged on the sixth day after the enucleation.

On November 14, manifest refraction: -3.50 sphere -0.75 cylinder axis $165^\circ = 6/6 -2$. There was slight injection of the episcleral vessels, but no ciliary injection. There was slight ciliary body tenderness over

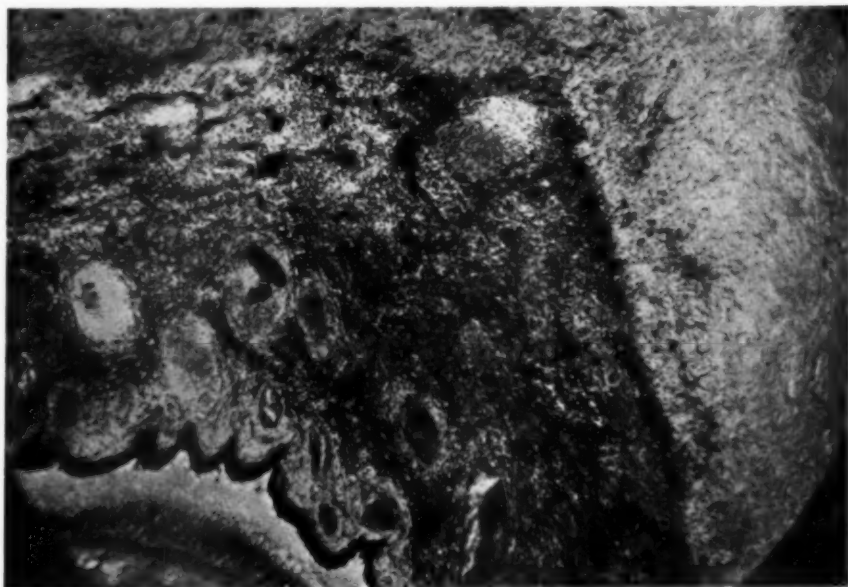


Fig. 1. (Swab) Low power photomicrograph showing marked inflammatory infiltration of choroid.

point was 18 cm. There was no ciliary injection, no descemetitis, no iritis, no vitreous change, no fundus pathology. Visual field studies showed no pathology. Refraction under homatropine: -1.00 sphere -0.75 cylinder axis $165^\circ = 6/6$.

I referred the patient to Dr. B. M. Kully for examination of the nose and throat. He reported infected tonsils and adenoids, with probable right antrum disease. Enucleation was again insistently advised. The exciting eye was enucleated under ether anesthesia on November 6, the patient refusing

the superior pole. Tension was subnormal. There was no descemetitis. A fine gray exudate was noted in the pupillary area. The pupil dilated unevenly and exhibited numerous firm synechiae. The patient was again hospitalized, and the usual intensive treatment was employed.

During the next two days the pupil dilated to four millimeters and appeared to be held by an annular synechia. Vision had fallen to 3/60 without correction. At this time, milk injections were given daily. On November 17, Doctor Kully removed the

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tonsils and adenoids under local anesthesia. Following a milk injection next day, the pupil became dilated ad maximum. The lens was practically covered with punctate spots of pigment and iris exudate. With -2.50 sphere -0.50 cylinder axis 165° vision was roughly determined at $6/15 +2$.

Improvement continued and the patient was discharged from the hospital on November 21. On December 1, vision was $6/12$ with $+0.25$ sphere. The patient was able to resume his work on December 13, with vision

anterior epithelium is in places absent. The pars iridica retinae is swollen, and near the angle of the iris is granular and disintegrating, exposing the underlying stroma. The lens lies directly on the posterior surface of the iris, but there is no exudate between the two.

Ciliary body: Just ahead of the ora serrata are focal and diffuse collections of small lymphocytes and plasma cells, especially numerous around the distended blood vessels. More of these cells are found just beneath the pars ciliaris retinae up to a region opposite

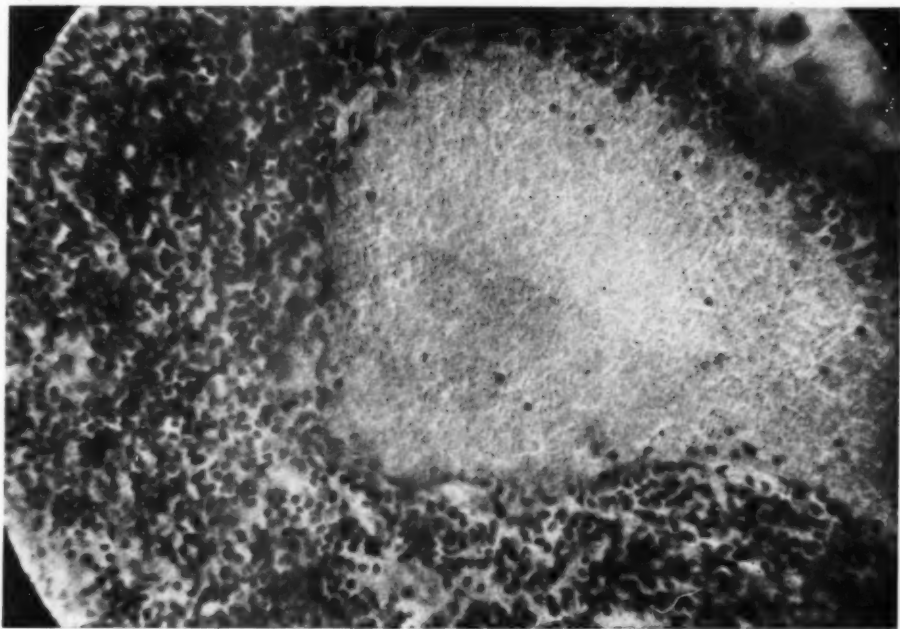


Fig. 2. (Swab) High power photomicrograph showing distended blood vessel of the choroid surrounded by small lymphocytes and scattered large mononuclear cells.

$6/6$ and near point twenty-one centimeters. No symptoms have arisen since that date. Final correction: $+0.25$ cylinder axis $45^\circ = 6/6 +5$.

Pathological report on enucleated right eye:

Iris: The blood vessels are everywhere distended with erythrocytes. The entire structure is moderately and diffusely infiltrated with small lymphocytes, plasma cells and occasional eosinophilic polymorphonuclears. The

the ciliary processes, where there is an especially large collection of small lymphocytes, plasma cells, and a few polymorphonuclears, but no epithelioid cells. Similarly, infiltrations occur in some of the ciliary processes. The pars ciliaris retinae seems intact.

Choroid: Here one sees the most marked changes, with edema, intense lymphocytic infiltration and hemorrhage. In the anterior half the layer is tremendously distended with pale albuminous fluid; in the posterior por-

tion the blood vessels are distended with red cells and there is some hemorrhage. To either side of the posterior pole of the eyeball there are dense nodules of small lymphocytes, especially thick around the blood vessels, and causing thickening of the whole layer. In these same regions are collections of large mononuclear cells resembling the epithelioid cells of tubercles, but there are no giant cells. The pigment epithelium overlying the choroid is everywhere swollen, and in the lamina vitrea there are numerous erythrocytes.

Comment: The most unusual feature of the case was the bizarre refractive change, which was adequately corrected for so long a time by means of concave lenses. The relative constancy of the astigmatism as to quantity and degree was striking. It is re-

grettable that no biomicroscopic studies were made; since, in retrospect, it was an ideal case for such examinations and might have added illumination upon the pathogenesis of the temporary myopia. Marchesani¹, in commenting upon the temporary change in refraction in two similar cases which he reported, stated that it was a "hitherto unmentioned symptom." Ellett², however, mentioned a similar development of myopia as an early symptom in one of his cases reported three years before Marchesani's publication of the above statement.

The writer wishes to express his thanks and appreciation to Dr. B. C. Russum for his careful studies and very detailed pathological report, only the outstanding features of which are here reproduced.

1316 Medical Arts building

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IMPRESSIONS OF EUROPEAN EYE CLINICS

LEO L. MAYER, M.D.

SAINT LOUIS, MISSOURI

The author describes special features of clinics visited in Vienna, Budapest, Zurich, Bâle, Paris and London. Read before the Ophthalmic Section of the Saint Louis Medical Society.

Of necessity an account of this nature must have its personal equations. To those of you who have had the privilege of seeing foreign clinics I hope I may recall fond memories. For you who have ambitions in that direction, if I may stimulate the urge I shall feel that this account has not been in vain. My itinerary included Vienna, Budapest, Zurich, Bâle, Paris and London.

Vienna, undoubtedly, is the paramount center. Here one finds two large, well equipped clinics, connected closely with ample hospital wards, numerous laboratories for investigative procedures, and an inexhaustible collection of pathological specimens.

For the past four years a special course for ophthalmologists has been

arranged by Dozent Fuchs, beginning usually around the first of October and ending in the middle of December. It is planned for men who have been in the practice of ophthalmology for some years and who desire to brush up on all phases of the work. It is highly concentrated, consisting mostly of lectures, all in English, given by the leading instructors at a moderate fee. This course is announced at intervals in the *American Journal of Ophthalmology*, and to my mind is the ideal in post-graduate training in the field which it encompasses.

The regular organizations for obtaining instruction consist of the American Medical Association of Vienna and the University of Vienna Course Bureau. The former is for English

speaking postgraduates, with a monthly registration of some one hundred and fifty members in the various branches of medicine and its allied subjects, and here any course may be arranged at the request of a number of members. The lecturer receives five dollars an hour, payment of which is divided among the members attending.

The Course Bureau is the postgraduate organization of the University, and takes care of all courses given in German. Necessarily the fee for such lectures is far less than for those given in English. Another method of obtaining instruction consists of a regular position as hospitant in clinic or hospital or both, for longer periods of time, carrying on the regular routine. Operative work is obtainable only in an affiliation of this sort, after six months or a year's time. Attendance in the operating rooms is permitted at all times, and the majority of instructors are pleasant, willing, and anxious to demonstrate their knowledge.

The largest clinics are a part of the University, Professor Meller is at the head of number one, and Professor Lindner was recently appointed head of number two. Both clinics are in old, unmodern buildings, with very little new equipment because of lack of funds, but nevertheless remarkable in their capacity. Professor Lauber is in charge of the city institution, which is very modern but small, and which is not prepared to offer extensive teaching but is most interesting. Various privately endowed hospitals and clinics exist throughout the city, and, although small, provide excellent opportunity for individual instruction under men of whom the majority were at one time assistants in one or other of the university clinics.

All patients entering a clinic are seen by the professor, who inspects casually and assigns each to either the treatment group or the group for thorough investigation. Thus we first see the division of "red eyes" and "white eyes" which is characteristic of clinics on the continent. One assistant treats all the "red eyes" except the trachoma cases. The latter are weeded out and

treated daily with the copper stick, which cures all cases in from two to three years with no other procedures, at least this is the explanation given.

In treating the infectious cases, methods such as we are accustomed to are used, except possibly the constant application of weak solutions of silver nitrate. Noninfected cases are refracted in a manner unimpressive, to say the least, but fundus examinations are very thorough with routine use of the indirect method and the help of the large Gullstrand ophthalmoscope, red free light, and the slit-lamp where indicated.

The tension is measured for the most part by palpatory methods, and fields, taken infrequently, are however very exact and painstakingly outlined. Skiascopy according to Lindner's method is used extensively, but postcycloplegic tests are frequent, and more attention is paid to the subjective findings than to the theoretical basis. Fundus pictures of unusual cases are expertly taken.

In the operating room one is impressed by the simplicity of the methods. All ambulatory patients walk in and out of the operating room. No general anesthetics or preoperative sedatives are given. Cleansing is done with soap and water, and irrigation with a weak solution of potassium permanganate. At times tincture of iodine is used on the lids and eyebrows. Akinesis, ciliary ganglion injection, subconjunctival injection, and local use of cocaine are frequent. All instruments are sterilized by boiling. The operator sits to the right of the patient, who is facing him, thus the left eye is operated with the right hand and vice versa.

Cataracts are done in the usual way with a conjunctival flap, and no stitches are used until after the finish of the operation. The cystotome is the instrument of choice for the capsulotomy, and iridectomy follows extraction of the lens and is for the most part peripheral. Discission is done with two knife-needles. Cyclodialysis is used, and infrequently a trephine operation for simple glaucoma, with

be obtained. The inventor thinks that it is easier to study a light moving in the pupil "with" the motion of the mirror than "against," and therefore advises for the study of myopic eyes the adjustment which gives the concave mirror effect. This may be a help to some, but the writer thinks that the conditions are debatable. It seems to him that, given errors of like degree, there is but little choice in the ease of determination of the movement of the light whether with or against.

The streak may be made fairly broad or a fine line, and the latter is advised for small presbyopic pupils where retinoscopy without mydriasis is at times helpful. This seemed very probably a useful feature of the instrument, and the writer was surprised when he found that the motion of the reflex with the ordinary plane mirror was more readily observed than the finest

streak possible with the new instrument. This has been confirmed by others.

One thing which is very quickly missed with the streak method is the ease of determining the presence of astigmatism by the band of light found in the pupil, and also the axis of the astigmatism. With the new instrument the streak must be rotated by a collar on the handle through the different meridians and the question of astigmatism settled by the variation in the power of the lenses required to bring about a reversal of the movement. This is much slower and more complicated than the old method and yields results no more accurate.

The instrument is quite expensive, and in the experience of the writer does not justify itself either as to simplicity of method or by accuracy of results.

1530 Locust street.

SOCIETY PROCEEDINGS

COLLEGE OF PHYSICIANS OF PHILADELPHIA

Section on Ophthalmology

December 15, 1927

DR. EDWARD A. SHUMWAY, chairman

Symblepharon from molten metal, with plastic repair

DR. BURTON CHANCE exhibited a case of plastic repair in a symblepharon following burns by molten metal. The operation had consisted of dissection of the cicatricial mass by Arlt's method, namely ligation of restricting bands, and covering the raw surfaces with a graft from the upper cul-de-sac.

Ptosis and paralysis of the superior rectus

DR. CHANCE exhibited a case of complete ptosis and paralysis of the superior rectus of the right eye, believed to have been caused during birth. It was relieved by a tucking advancement of the superior rectus muscle and tenotomy of the inferior rectus, and Hess's operation on the lid.

Fibrous tissue on the optic disc

DR. CHANCE also showed a case with obscuration of the optic disc by a mass of fibrous material, probably formed after extravasation.

Hemorrhage into optic nerve sheath occurring in the fellow eye after a ten-year interval.

DR. GEORGE H. CROSS reported the case of H. L. M., merchant, aged 51 years, who had been a patient in 1911, at which time vision in each eye was 20/15. On December 19, 1914, at 8 p.m., the patient stated, he had started to lose vision in the right eye about ten o'clock in the morning, and by 4:30 p.m., everything was black; he had some slight pain in the eyeball. Two days previously he had walked into a door-jamb, striking the right eyebrow. The next day he had helped lift a barrel of chickens into a wagon and had lifted a barrel of turnips out of a wagon. He was not in pain and only came to the office following the insistence of members of his family that he obtain medical advice.

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Examination: Right eye, pupil 5 mm., round, reacted slightly and very sluggishly to light. Ophthalmoscopic examination: Media clear, disc round, margins sharply defined, color good, a large physiological cup present, blood vessels somewhat full but not swollen or tortuous, macula normal. There were no hemorrhages or areas of pigment disturbance noted. Blood pressure was 183 mm. Vision, no light perception. December 22, 1914, disc margin somewhat blurred, no other changes noted. December 26, 1914, serous edema of the retina, manifested by a swelling surrounding the disc. December 29, 1914, consultation with Dr. Radcliffe and Dr. Schwenk, both of whom concurred in the diagnosis of hemorrhage in the sheath of the optic nerve in the right eye.

About ten years later, on May 5, 1924, while on his farm, the patient ran up a hill, yelling, to chase some cows out of a cornfield. Suddenly objects began to blur and he started toward his house. He reached the porch calling for help, as he could not see to get about. His family doctor stated his systolic pressure at this time was 260 mm. On examination, his left eye revealed a similar condition to the right eye except that he claimed to be able to distinguish a very bright light. He stated that he had had severe headache for many years, and that several weeks before this attack, while driving a horse along the road, he had suffered a temporary loss of vision which later cleared so that he could see to drive home, also he had numerous nasal hemorrhages.

(Eight weeks before his death, which occurred on April 26, 1927, he had a tremendous nasal hemorrhage.)

Acute unilateral toxic optic neuritis

DR. G. ORAM RING presented a report on a man aged 36 years who had been in perfect health but had noted a slight blurring of vision about one week previous to Dr. Ring's examination, the blur just before his visit being so dense as to suggest impending blindness. The right eye was normal. In the left, there was a questionable light percep-

tion with swelling of the nerve head two diopters above the eye ground but no other fundus lesion. Light response was sluggish in the affected eye. The only urinary findings consisted of the presence of oxaluria and a too high specific gravity. The blood count revealed a leucocytosis (11,250) with an approximately normal differential. The Wassermann reaction was negative. An x-ray of the teeth condemned a left central incisor which was extracted and upon culture was found to be infected with hemolytic and viridans streptococci. Both tonsils showed the presence of the same organisms, the hemolytic predominating. The tonsils were promptly removed. Sinus x-ray showed some thickening of the ethmoid cells of the opposite side, but clinical examination revealed a marked septal deflection with middle turbinal pressure on the affected side, but no clinical signs of sinus disease. As a precautionary measure the septum was resected so that the sinuses could be opened on the left side, if the response to the other measures was not pronounced. The examination other than that noted above was negative. An autogenous vaccine was promptly given and was continued until 20 c. c. had been administered. The elimination from the skin, the kidneys, and intestine was attended to. As the toxemia was removed, the vision began to return, and upon the date of this report it had improved to 20/30 with almost normal field.

Reference was made in the paper to the fact that in the author's experience the toxic manifestations in association with disease of the teeth were usually in the uveal tract, less frequently noted as a sclerokeratitis, occasionally as a fugacious episcleral congestion, and rarely as an optic nerve involvement.

Discussion. DR. WILLIAM ZENTMAYER said that, without intending in any way to question the etiologic diagnosis made by Dr. Ring in his case, and though he fully agreed in the removal of possible foci of infection, he thought that, in drawing a conclusion from the results following such re-

moval, he should bear in mind that the prognosis in acute retrobulbar neuritis was on the whole favorable, many of the cases tending to recover under general treatment. In nearly all cases of retrobulbar neuritis, even where the visual function of the eye had been recovered in full, a pallor of the papilla was observed, which was permanent.

DR. LUTHER C. PETER stated that the residual atrophy and visual disturbance which one found in these cases was in direct relation to the promptness with which operative procedures were instituted. This was particularly true when the infection arose in the nasal sinuses. It was true that many of these patients showed a residual atrophy with what seemed to be fairly normal fields, but careful study, especially by colored test objects, demonstrated the fact that the fields did not fully recover, and central vision rarely became entirely normal. This relation between the residual field disturbance and the time of operation emphasized the necessity for prompt action in determining the source of infection, and, if possible, eliminating it.

DR. RING (closing) expressed the definite conviction that the toxemia resulted in his case from the teeth and tonsils, and said that the septal work was precautionary. He advised taking nothing for granted, and advocated hunting for and eliminating every discoverable source of toxemia.

Disease of the eye and its adnexa due to fungi and higher bacteria

DR. SANFORD R. GIFFORD, of Omaha, Nebraska, pointed out that conditions suitable for the growth of fungi and higher bacteria were met with in the conjunctival sac or on the cornea, and a number of these organisms so prevalent in nature had been reported rarely as causing various ocular conditions. An organism resembling the leptothrix, forming delicate, unbranched threads, had been found in sections from Parinaud's conjunctivitis. Dr. Gifford reported finding a similar organism in two out of three cases. He had also found leptothrix in cultures in a case of chronic conjunctivitis and in several cases of chronic infection of

the meibomian glands. Streptothrix or actinomyces forming delicate threads which showed true branching was the cause of concretions of the canaliculi. This condition was a fairly common one, the reporter having seen seven cases, in two of which pure cultures of actinomyces had been obtained. All the cases cleared up rapidly when the canaliculus was slit and the concretion removed. In these cases actinomyces acted as a saphrophyte growing in the canaliculus, but other cases were reported in the literature in which it had acted as a true pathogenic agent, producing ulcers, membranous conjunctivitis, and orbital cellulitis. A brief review was given of the literature of infections around the eye by sporotrichosis, especially common in the Mississippi Basin. In Omaha, Dr. Gifford had seen six cases, in one of which a pure culture had been obtained. (The reporter has seen three cases, with pure cultures obtained in two.) Diagnosis by cultures was valuable in these cases, since the use of potassium iodide internally and locally nearly always brought about a cure.

The reported cases of infection of the cornea with aspergillus, the usual cause of keratomycosis, were discussed. Dr. Gifford reported one case which had resulted in panophthalmitis, and showed sections of the cornea from this case. The importance of bacteriological examinations, which would reveal occasional infections by these unusual organisms, was emphasized.

Discussion. DR. FRED D. WEIDMAN had studied only two lots of such material from the eye. Both had been received from Dr. Shumway. One was a fresh culture from a lacrimal calculus, and the other was an old, dried out specimen of lacrimal calculus. In the former, after much study, he had finally come to the conclusion that the thread organism concerned was not a streptothrix or leptothrix but a bacillus in chains. In the second case nothing grew in the cultures, but on direct examination made from teasing of the specimen the classical filaments of actinomyces were found, and the case

may very well have been caused by *actinomyces foersteri*. It was necessary to study streptothrix materials in vivo (hanging drop preparation) before finally deciding between the bacillus in chains and some of the thread organisms. Ordinary smears would not do.

Turning next to Dr. Gifford's presentation, the classification of the fungi was notoriously mixed up, and in a short discussion like this it was useless to attempt to include that phase of the subject. It would be necessary to exercise caution in respect to leptothrix infection as seen in sections, because elastic fibers sometimes simulated these nonbranching filaments. Concerning concretions in the tarsus, there was also reason to exercise caution before finally concluding that they were of fungus causation, because there were such extensive fatty foci in this situation. Frozen sections, stained by Sudan 3, would disclose that normally the tarsus was extensively and diffusely infiltrated by fat, and these circumstances favored the infiltration of lime salts. As to aspergillus infections, it was not common to find the fruit heads in tissues; aeration seemed necessary to bring them out. In autopsies on parrots at the Zoological Garden, the forms found in the caseous mesenteric lymph nodes were exclusively mycelial, whereas in the lungs the classic fruit heads could be seen extending into the air sacs.

Iodine was the great standby in fungus infections anywhere in the body. In the eye, the urgency might be so great as to require most radical iodine therapy. In some cutaneous mycoses the French were employing Lugol's solution intramuscularly, ten c. c. to the dose, or seven intravenously, mixed with serum. He doubted very much that such extreme measures were commonly indicated in dermatology.

DR. WILLIAM ZENTMAYER wished to recall to Dr. Weidman's memory a third case of calculus of the canaliculus which he had studied and on which he had been kind enough to give a report and some beautiful microphotographs. The case was that of a colored woman,

aged 56 years, who had come to the hospital because of a swelling over the upper canaliculus, accompanied by a mucoid discharge from the punctum. The condition was of two years' duration. The calculus removed was a spheroidal, yellowish-white, stony body about four mm. in size, the surface finely granular and homogeneous. Dr. Weidman had reported that the calculus was composed practically entirely of the threads of a streptothrix, such as had frequently been described in this class of cases. Cultural studies were negative, probably because the calculus was kept dry for a long time. Microphotographs were presented to show the character of the growth.

DR. EDWARD SHUMWAY said that one of the specimens of lacrimal concretion mentioned by Dr. Weidman was from a patient of Dr. Zentmayer's. Dr. Shumway had reported two cases, but in only one was a pathological examination made. In this case a bacillus in chains was reported by Dr. Weidman, which had not been definitely identified, and Dr. Shumway thought the clinical condition was due to the presence of this organism. In ordinary cases, the concretion produced no destruction of tissue locally, but in this patient there was a cavity back of the canaliculus, which connected with a fistulous opening in the conjunctiva in the lower cul-de-sac. In the second case the concretion was in the upper canaliculus and produced no destruction of tissue, and its removal was followed by prompt cure of the dacryocystitis.

Massive phlegmon following novocain injection in a diabetic

DR. LUTHER C. PETER and DR. EDMUND B. SPAETH presented a case of bilateral intracapsular lens extraction for senile cataract. The extractions were done after preliminary iridectomies. The extraction in the left eye was entirely uneventful. Before the left lens extraction, blood sugar was as high as 160 mg. per 100 c. c., though it was normal the day before and the day of the operation. Extraction was done

under cocain instillations, and with novocain injections under the conjunctiva at the limbus at the site of the usual conjunctival flap and at the outer canthus to block the filaments of the facial nerve supplying the orbicularis palpebrarum. Recovery was normal.

The lens extraction operation for the right eye was done about six weeks later. The day before the operation, blood sugar content was 105 mg. per 100 c. c. For some reason the blood sugar content was not taken the day of the operation. The same technique was used at this time as was used for the left eye. The extraction was most uneventful. Three hours after the operation, the patient complained of great pain over the external canthal angle. This had to be quieted with morphine. The next morning there was a tremendous swelling of all the tissues over the external canthal angle with a very slight rise of temperature. Blood sugar that day was 360 mg. per 100 c. c. The first dressing was done 24 hours later, a total of 48 hours after the operation. Swelling had increased during this interval until the right side of the face was at least one-third larger than the left. The swelling was a brawny red, hot, and with very tense skin. It was impossible to open the lids. Without further anesthesia, the upper and lower lids were incised throughout their entire length down to the fascia, and the outer canthus from the angle externally for two inches. The subdermal tissues were a pale gray color, and showed a sharp line of demarcation from the more nearly normal superimposed dermal and epidermal tissues. There was no suppuration, however, though some blood-tinged serum exuded from the cut phlegmonous tissues. When the lids were opened, it was seen that the area of injected conjunctiva was also involved in this gangrenous process, though here some suppuration had started. The pupil was dilated, anterior chamber reformed, and the cornea and iris seemed normal. One day later, suppuration had started in the gangrenous tissue. For several days this tissue

could be seen sequestering itself from the normal tissues above and below it. After seven days, the suppuration had advanced so extensively that radical incisions were made in the face, cheek and temporal scalp, Dakin's tubes inserted, and the case treated with Dakin's solution irrigations.

The affected conjunctiva sloughed off in toto without damage to the eye or without nullifying the results of the lens extraction save for one small corneal nebula and for some irregular astigmatism of the cornea, both of which were disappearing rather rapidly. After four weeks, the patient was discharged with the recovery now seen. Two weeks later he was readmitted with a gangrenous ulcer over the os calcis following a small blister from a new pair of house slippers. This also was recovering rapidly.

The blood-sugar, which had reached 360 mg. per 100 c. c. twenty-four hours after the operation, dropped to as low as 76 mg. per 100 c. c. At that time the patient had two mild attacks of insulin shock. The blood-sugar would swing from 200 to less than 100 mg. per 100 c. c. within 24 hours under insulin therapy and dietary control. It was most difficult to establish a dietary-insulin-blood-sugar balance in the case. During the recovery period, the patient's condition was an infallible index of the state of his blood-sugar. As this went up, so also did the patient's temperature, and pain at the site of the phlegmon and the amount of suppuration ascended.

The problem now remaining was a simple one of plastic surgery. The case illustrated the danger of tissue damage in diabetes. Sterile water would probably have caused the same degree of tissue reaction and damage as was here caused by the novocain injection. The outstanding fault in the case was the failure to determine blood-sugar content on the day of the operation.

Discussion. DR. EDWARD A. SHUMWAY said that consultation with Dr. Petty brought from him the dictum that the upper limit of safety for any operation

was 155 mg. in the blood in a diabetic or potential diabetic.

Traumatic iridodialysis with macular changes

DR. FREDERICK KRAUSS presented a patient with rupture of the iris associated with macular and other changes. He had been shot in the right eye with a piece of tin-foil. The concussion produced a large hemorrhage in the anterior chamber. Upon its absorption, there was found a rupture near the outer rim of the iris, a large Vossius ring on the lens, and a decided wrinkling of Descemet's membrane. There was also a marked neuroretinitis. A few weeks later the macula was seen as a large hemorrhagic spot surrounded by spoke-like radiations in the retina, which were visible with red-free light. The vision remained low and the field greatly contracted, with a large absolute scotoma to the temporal side of fixation.

DR. LEIGHTON F. APPLEMAN,
Clerk.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

January 17, 1928

DR. E. K. ELLIS, president.

Buphthalmos with dislocated lens

DR. H. C. RIEMER presented a boy who had been first seen when four years old with a diagnosis of buphthalmos in both eyes, with tremulous iris and tension thirty mm. Pilocarpin was then prescribed. At that time there was no mention of a dislocated lens.

In 1919 Dr. Verhoeff did an iridectomy in the right eye, after which the patient was lost track of for some time. In May, 1923, hospital records described treatment for corneal ulcer in this eye, and on January 3, 1928 the patient came back with the eye completely blind and staphylomatous, seeking treatment for the left eye which had a tension of 60 mm. The right eye was enucleated and the left put on miotics, bringing the tension down to normal.

The lens could be seen in the vitreous by looking from above downward. According to Dr. Verhoeff, it was rather unusual to have a dislocated lens in buphthalmos. Vision was 20/50 with + 9. D. sphere. In spite of discussion of what had happened to the other eye and what commonly happened if a lens were allowed to remain in the vitreous, the parents objected to operation.

Buphthalmos in both eyes

DR. RIEMER showed an infant that had stayed in the hospital from September till October, 1927, with a purulent conjunctivitis. He was brought back in December, when it was discovered that he had buphthalmos. The question was whether it was a case of congenital or of infantile glaucoma? The cornea was markedly enlarged and the sclera stretched. The cornea of the left eye was steamy, with tension 26 mm. under ether. Iridotaxis had been selected as the operative procedure for both eyes because after this operation in another baby whose case was very similar to this one, and who was now seven years old, the tension had remained low with the cornea practically clear.

Discussion. DR. G. H. RYDER reported the case of a baby girl of fourteen months, seen twelve years ago, who had congenital buphthalmos in the right eye only. He performed a trephining. Up to a few months ago the eye had not increased in size nor had it given her any trouble.

Hematogenous pigmentation of the cornea

DR. RIEMER presented a patient eleven years of age, who had been struck in the left eye on November 4, 1927, while chopping wood. On November 11, the child was admitted to the hospital with a traumatic hyphema, considerable pain in the eye, and tension of 30 mm. On November 21, two weeks after the injury, pigmentation of the cornea was noticed. Dr. Riemer did not know why this occurred in some and not in all cases where there was hyphema, and said that Dr. Verhoeff had no explanation,

unless it was the length of time the hemorrhage remained in the anterior chamber.

Pemphigus

DR. RIEMER reported a case showing the typical picture of pemphigus. The right eye was given several x-ray treatments and seemed to improve somewhat, so the left eye was treated, but no change was noticed in it. The patient had not been seen for two weeks.

Inert foreign body in vitreous

DR. RIEMER showed a boy who had found a dynamite cap, which had exploded. X-ray showed an intraocular foreign body in the vitreous. The vision was so good, with no reaction, that Dr. Verhoeff had suggested that the foreign body was probably solder and not copper or lead, and would probably remain inert in the vitreous. The foreign body could be seen with the ophthalmoscope.

Uveitis with secondary glaucoma

DR. HENRY HAWKINS presented a patient whose physician had given the following history: On June 17 the patient's eyes had high tension, yielding to miotics in a few days. Symptoms of uveitis became manifest from the last of June to the last of July and he was treated with mydriatics. Blood test and x-ray of teeth and sinuses were negative.

In the last week of July the tension increased rapidly. On August 1, examination showed both eyes slightly injected, and pupils irregular (egg shaped), about one-half dilated. The cornea was hazy and no fundus details could be seen. Vision was light perception. The case was referred to the hospital, and kept under pilocarpin and eserine for 48 hours. Tension was so high that it could not be taken with a tonometer. On August 3, a double iridectomy was performed. On August 25, vision of right eye was light perception; left eye 20/70. In September the vision was 20/100 and the tension again increased; right eye 70, left eye 80. Dr. Verhoeff, in consultation, recommended operation. Trephining was performed. Patient made an uneventful recovery. Vision gradu-

ally increased and media cleared. He could get a fair detail of the fundus and vision was 20/20.

The question was how long would the eye remain quiet.

Pituitary adenoma

DR. BENJAMIN SACHS presented a patient 37 years of age, who had a history of gradual loss of vision, of one year's duration, without pain or seeing halos; occasional headaches, no vomiting. Three months ago he had been told that he had glaucoma in both eyes and had been given pilocarpin, but vision kept on failing.

Examination was externally negative, pupils equal, reacted slowly, better when stimulated on the nasal side. Anterior chamber was of normal depth. With correction, right eye saw 20/40 and left eye 20/100. Fundi showed primary optic atrophy without cupping. Tension was 16 mm. in each eye. Fields showed in right a remainder of only the upper nasal quadrant with a relative central scotoma, and in the left eye an absence of the lower temporal field. Dr. Cushing removed a large pituitary adenoma. On December 15, vision of right eye was improved to 20/20, left eye 20/50. The field of the left eye was normal, and the right temporal field was normal, but the lower nasal field was gone. The blind spots were enlarged. Fundi were unchanged. The tension was normal. In January right vision was improved to 20/20 plus, left eye 20/40. Fields were unchanged except in the right eye, and blind spot was enlarged downward and connected with the nasal contraction, resembling a Bjerrum sign. Tension was 16, whether pupils were small or large. Discs still showed optic atrophy without cupping. It was the opinion that the field defects were due to the pituitary tumor.

Discussion. DR. RYDER reported the case of a woman seen five or six years ago, in whom the field changes were not particularly noticeable at first. Later, a very definite quadrant defect was found in one eye, with a suggestion of the same thing in the other eye. Refraction was moderately myopic and

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glasses had been changed the summer before. X-ray strongly suggested pituitary trouble. She had suppression of menses since the age of 33 years, had not grown stout nor had headaches or general discomfort of any kind, except not seeing well. In June, she was operated on transphenoidally and a moderate quantity of grumous tissue removed. It was reported as adenoma. Vision improved markedly after operation. No special difficulty followed until one and a half years later, when she had recurrence of lowered vision. She had vigorous radium and x-ray treatments in the meantime. Dr. Cushing operated a second time, going in through the temporal region and under the brain. He got out a little more soft mass. She recovered quite a lot of vision at that time. After two years she had trouble again. Dr. Cushing again operated through the temporal bone, expecting to find a cyst. He did not find anything special, but removed a little tissue of indefinite nature. Patient had been operated on under local anesthesia and she went to pieces nervously. Vision improved somewhat. Two months ago she had vision of 1/10 in one eye and very poor vision in the other, not improved by glasses. Her history covered a period of six or seven years. She was now pretty comfortable except for nervousness, but the prognosis was poor.

Keratitis profunda

DR. JAMES J. REGAN presented a patient 39 years of age, male, married, newspaper reporter, with a history that six weeks previously the right eyeball had been moderately reddened with increasing blurring of vision. No pain or photophobia. Slit-lamp examination showed lattice-like infiltration covering two-thirds of the parenchyma of the cornea—densest at the center. No vessels were made out with high power. General physical examination was negative. Wassermann was negative. Two weeks later the infiltration had diminished about one-half.

S. JUDD BEACH,
Secretary.

NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

January 16, 1928

DR. J. L. BRYAN presiding

Herpes zoster ophthalmicus complicated by acute glaucoma

DR. W. G. KENNON reported the case of Mrs. J. T. S., aged 52 years, who was first seen December 12, 1927. The chief complaint was inflamed and painful right eye for the past two weeks.

Three days before the eye became inflamed there was pain, redness and formation of blisters over the right side of forehead and around the right eye. Following this the eye became inflamed and very painful, with some dimness of vision. Three days ago she noticed that she could only see shadows with this eye.

The skin of the lids of the right eye, right side of the forehead, temple, and right side of the nose showed superficial scab formation in small circumscribed areas. This was like typical healing herpes vesicles. Examination of the eye showed extraocular muscle action normal. There was slight pericorneal congestion. The cornea was slightly hazy, the pupil semidilated, slightly elliptically, and not reacting to light. The iris was muddy. The eye felt hard to the touch. The appearance was that of acute iritis. Vision was light perception. Tension with the Schiötz tonometer was 40 mm. The gravity of the condition was explained to the patient and she was given a prescription of pilocarpin-esserin solution to be used in the eye every two hours, and ordered to report the next day. Four days later she reported with her condition considerably improved. The cloudiness of the cornea had disappeared. There was still slight pericorneal congestion; the pupil was small and her vision in the right eye was 20/200. Her tension was 23 mm. She again reported on December 21. Her vision was 20/40, tension 20 mm. On December 28, the vision was 20/20 in each eye and the tension of the right eye was 20 mm.

Discussion. DR. HILLIARD WOOD, seriously doubted if there were any plausible connection between the herpes zoster and the glaucoma. Glaucoma was rare, but herpes zoster was even more so. Dr. Kennon said that he had seen three cases of herpes zoster ophthalmicus and Dr. Wood had seen about that many cases, therefore it would not be expected that the two things were often associated. He did not believe that there was any connection between the glaucoma and the herpes zoster, but that the patient had two diseases that were purely coincidental, and had no relation of cause and effect. He approved the use of miotics even with some apparent involvement of the iris.

DR. ROBERT SULLIVAN said that he had never heard of this condition, but had looked it up and found that it was occasionally recorded.

DR. E. L. ROBERTS felt as Dr. Wood did, that the association of the two diseases was purely accidental.

DR. HERSCHELL EZELL said that herpes zoster ophthalmicus was a rare disease. He did not know how unusual and serious it was until he read a chapter in the American Encyclopedia of Ophthalmology which said that out of 30,447 cases treated in Wills Eye Hospital in 1913-14, only four cases of herpes zoster ophthalmicus were reported. In reading the chapter he did not find any mention made of glaucoma being a complication of herpes zoster ophthalmicus. But Fuchs mentioned it. So apparently glaucoma was a recognized complication of herpes zoster ophthalmicus.

DR. KENNON in closing, was inclined to believe that the glaucoma had some relation with the herpes zoster.

HERSCHELL EZELL,
Secretary.

LOS ANGELES COUNTY MEDICAL SOCIETY

Eye and Ear Section

February, 1928

DR. BERTRAM DAVIES, president

Dislocation of the lens

DR. M. F. WEYMANN presented a woman who had had failure of vision

in both eyes for eight to ten years. The vision in the right eye was 20/150+, and in the left was motion of a hand in the temporal field. There were diffuse nuclear and cortical changes in the right lens; iris was slightly tremulous, and the slit-lamp showed a cobweb of persistent pupillary membrane which was anterior to and not attached to the lens capsule. There was a space between the iris and lens as if the lens were dislocated backward. The left eye showed a markedly tremulous iris to which were attached shreds of pupillary membrane. The lens lay in the lower portion of the vitreous, and there was a marked retinitis proliferans visible through the clear pupil. Both corneae showed with the slit-lamp crystalline subepithelial punctate opacities which might be cholesterol. Dr. Weymann asked as to the advisability of extracting the right lens.

Discussion. DR. WILLIAM BOYCE stated that the extraction of such a partially dislocated lens was extremely dangerous, but that he thought that with such lowered visual acuity it would be advisable to attempt it.

Iridotaxis

DR. M. F. WEYMANN presented two patients upon whom he had done iridotaxis for chronic simple glaucoma in both eyes. The small amount of distortion of the pupil had been surprising. The operation had produced good filtering blebs and the technique was fairly simple. There had been less post-operative shock following this procedure than after iridectomy or Elliot's operation. Where the field was near the fixation point there had been no sudden decrease in its limits due to operation. Dr. Weymann stated that sufficient time had not elapsed with the number of operations done to determine the permanency of results but that the immediate results had impressed him favorably. Iridotaxis should not be done where there was any tendency toward iritis with the glaucoma.

Discussion. DR. WILLIAM BOYCE said that iridotaxis was being done by his service in the general hospital with quite good immediate results.

Acute hypotony in retinal detachment

DR. M. N. BEIGELMAN reported the literature upon acute hypotony in retinal detachment and his observations upon a patient seen by himself. The patient complained of sudden loss of sight in the left eye, which was myopic. A week later the patient complained of pain, there was pericorneal congestion, the pupil was small, anterior chamber deep, and the iris was drawn backward and tremulous. There was a dark solid protrusion from the fundus on the nasal side suggestive of choroidal detachment. The ocular tension was so low that there was a folding of the sclera on ocular movements. Under ordinary treatment the ocular tension returned to normal and the inflammation subsided. Dr. Beigelman concluded that acute hypotony, characterized by a great decrease of ocular tension, a sudden deepening of the anterior chamber, and a mild form of uveitis constituted a definite clinical entity, which occurred only in retinal detachment. The prognosis was favorable and the treatment should be conservative. Acute hypotony was probably due to sudden absorption of the liquid of the vitreous by the chorio-capillaris. Cases of simple retinal detachment might also be explained by the decrease in volume of the vitreous due to absorption of fluids from it by the chorio-capillaris. There was always some hypotony in simple retinal detachment.

Discussion. DR. A. R. IRVINE called attention to the fact that unobserved choroidal detachment was present in a high percentage of eyes following operative procedures. Our knowledge of the structure of the vitreous was constantly increasing, and many facts heretofore unexplained were coming to light. The report of this patient should keep us on the lookout for similar cases and should tend to make us conservative in our prognosis and treatment of hypotony. It was of great interest to consider detachment of the retina as a secondary effect of hypotony, the hypotony being due to absorption of fluid from the vitreous.

M. F. WEYMANN,
Clerk.

THE BROOKLYN OPHTHALMOLOGICAL SOCIETY

February 16, 1928

DR. JAMES H. ANDREW, presiding

Meningocele

DR. JAMES H. ANDREW presented a case with a history of swelling at the upper inner angle of the right orbit at birth. The tumor increased in size when the child cried and when the head was held down. It could be reduced but promptly returned. A notch could be felt between the ethmoid and frontal bones. The x-ray was of no value.

Tuberculoma of choroid

DR. RALPH I. LLOYD reported on a patient whose chief complaint was sudden loss of vision in one eye. Examination showed a single large mass in the choroid, with nothing in the vitreous. There was no ciliary injection. The slit-lamp showed typical nodules on the edge of the iris, with a very great amount of deposit on the posterior surface of the cornea. The Pirquet test was positive but the reaction was slow. The Wassermann and urine examinations were negative. These cases must be differentiated from disciform degeneration of the macula, resembling retinitis circinata, as well as from angioma of the choroid, Coats' disease and Hippel's disease. Dr. Lloyd showed numerous lantern slides demonstrating these different conditions.

Melanosarcoma of choroid

DR. E. CLIFFORD PLACE reported the case of a patient who presented himself June 28, 1927, with the history of pain and redness in the left eye. The vision of the right eye was 20/15; of the left eye 20/25. On the nasal side of this eye there was a globular retinal detachment of pronounced size. Transillumination showed it to be opaque. The diagnosis of sarcoma of the choroid was made, and on July 2 the eye was enucleated. The specimen, which was shown, consisted of a large mass, the outer part of which was extravasated blood surrounding the central core of melanosarcoma. Microscopi-

cally it was shown that the sclera had not been perforated.

Rate of macular elimination of after images

DR. JOHN EVANS read the paper which has appeared in full in the American Journal of Ophthalmology (vol. 11, p. 194).

Tumors of the eye

DR. BERNARD F. SAMUELS showed and explained numerous slides of the two most common varieties of intraocular growth, sarcoma of the choroid and glioma of the retina.

WM. F. C. STEINBUGLER,
Secretary.

KANSAS CITY EYE, EAR, NOSE, AND THROAT SOCIETY

February 16, 1928

DR. ALVIN LORIE presiding

Early diagnosis and treatment of glaucoma

DR. R. J. CURDY read a paper which will be published in this journal.

The management of established glaucoma

DR. EDWIN N. ROBERTSON, of Concordia, Kansas, read a paper which will be published in this journal.

Discussion. DR. J. W. KIMBERLIN stated that in the presence of pathological cupping without pressure potential glaucoma still existed, and that the cupping was prima facie evidence that active glaucoma had at some time been present in the eye. He cited

Posey's routine brought out in an article some ten or twelve years ago.

DR. A. M. LEMOINE stated that the results from adrenalin had been rather disastrous in several of his cases of glaucoma and he attributed the bad results to the percentage of the secretory type.

DR. T. S. BLAKESLEY advocated the use of the 1000 watt lamp for one or two hours in the acute types, to be followed by standard treatment after the acute stage had subsided. He cited several cases of this nature which had readily responded to this method.

DR. JIM MAY mentioned several cases which obtained quick relief from acute attacks by the use of adrenalin. He did not believe that the subjective symptom of halos could be relied upon as a cardinal symptom of glaucoma.

DR. MORRIS H. CLARK said that frequent and careful observation of the visual field was probably the best criterion for surgical intervention. In those border-line cases where medical treatment was being used as a palliative measure, and regardless of whether subjective symptoms did or did not become evident, enlarging blind spot, peripheral contraction, or presence of various scotomata were of sufficient importance to warrant operative measures.

DR. CURDY (closing) recognized the danger of adrenalin especially in the presence of vascular disease, but felt that it had its advantage in selected cases.

DR. MORRIS H. CLARK,
Reporter.

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American Journal of Ophthalmology

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THE STUDY OF OPHTHALMOLOGY

Some parts of ophthalmology should be known to every practitioner of medicine or surgery; and these should be taught to medical students. But teachers of ophthalmology have generally reached the conclusion that it is not practical to give, in the undergraduate medical course, instruction that would fit a recent graduate to practice ophthalmology as his special field. Fitness for such special practice is gained only by graduate study.

It is also agreed that the study of books, with observation of cases of eye disease in a clinic, or of such cases as will present in practice, will not give the needed mastery of the subject. It is after leaving the medical school that ophthalmology must become a subject for serious systematic study; and the system and methods for such study are yet undeveloped. Those who have done most teaching of ophthalmology have shaped their courses to the needs and limitations of the crowded undergraduate medical curriculum; and they may not have given any thought to the problems of preparing students for special practice. Between private

practice, clinical service, teaching undergraduate students and instructing patients how to make the best use of their eyes, they have been so occupied that neither time nor energy remained for solving the problems involved in the training of specialists. The institutions for graduate study of medicine are still in their embryonic period of development. It has scarcely been recognized that they are worthy of serious attention.

When "postgraduate" schools of medicine were first organized in America, almost fifty years ago, the established medical schools were proprietary institutions, dependent on the fees of students to pay expenses of building, equipment, and any compensation for the labor of teaching. It was natural that new institutions should look to the same source of income; and that they should offer first the clinical opportunities and operative training that were most in demand. Fundamental training in anatomy, physiology, pathology, and optics, was not supposed to be essential to success in ophthalmic practice; it being assumed that what was needful in that direction had been given in the medical

course, or in preparatory education. The common defects of training for ophthalmic practice are easily accounted for, but that does not make them less harmful. The old theory was that all medical students should have the same training, and that special skill in a certain direction must rest on individual ability and experience rather than systematic special training. If special skill was to be developed by special study, it had to be study in London, Paris, or Germany. Education could not be accepted as evidence of skill unless it was obtained in some distant medical center that had reputation in that regard.

The accepted tradition that special skill in a limited field of medicine was a matter of individual aptitude and interest, with which professional education and standards had little to do, has tended to keep low the standards of the profession and to hinder the development of the individual. With no general agreement as to what knowledge and skill might rightly be expected of the physician who limits his practice to ophthalmology, and no common statement of how that knowledge and skill should be obtained, each ophthalmologist has educated himself as best he could; and he becomes conscious from time to time of defects in his education that he might have avoided had he been better advised as to the essentials of what he was undertaking.

We have all seen such deficiencies in ourselves, and in colleagues with whose work we come in contact. Our information and training are not complete. Becoming conscious of this, each of us must be interested in the possible ways for removing such educational defects. We should wish to remedy them in our own education, and seek to make better the training of others who seek advice as to the best way to prepare themselves to succeed in our special department of medicine. The worst and most general defects in our education are associated with lack of fundamental training in the anatomy, physiology, histology, and pathology of the eye, or in the

principles and elementary facts of optics. Without the necessary preparation, we tried to learn by watching the practice in a public clinic or a private office; and from this inadequate start we proceeded to make the usual examinations, detect lesions, interpret symptoms, correct errors of refraction, and acquire operative skill.

To build a house it is better and easier to begin with the foundation. If the house is small enough, it may be possible to put together roof and sides, windows and doors, and then to stick a foundation underneath; but without the foundation the house will not be safe or permanent. It is so with building in education. If our knowledge has been put together on the old haphazard plan, the first thing to do is to put under it the best foundation possible. To the beginner, who seeks in ophthalmology his professional success, our most important advice is: Start right, by getting a good grasp of the fundamentals—the foundation studies. The ways in which it is possible to correct the mistakes of one's self-education in ophthalmology, and the discussion of plans to be followed by the young man starting to prepare himself for ophthalmic practice, are subjects of live interest to be taken up in future issues of this Journal.

E. J.

DETACHMENT OF THE RETINA

One of the subjects considered for the symposium at the coming International Congress was detachment of the retina. This was not the final selection, but in many ways a more interesting subject could not have been chosen. The results obtained by most ophthalmologists in treating this ailment certainly approach zero. Reference is here made to the large defects occupying at least one quadrant. If any new light could have been thrown on the treatment of detachment, or if some agreement could have been arrived at concerning the merits of the better known procedures such a symposium would have been of great benefit.

Extravagant claims have from time to time been made by individual surgeons, but the operations suggested by them have not proved equally successful in other hands.

The majority of simple detachments seem to be based on an inflammation of the choroid, causing an exudate in the outer layers of the retina and between retina and choroid. Other causes such as trauma, intraocular tumor, and high myopia are certainly less common. This variation as to the causative factor renders it logical to suppose that the same treatment is not equally well adapted to every case.

Where simple edema is the cause and there is no definite connection between the vitreous and the subretinal fluids, the problem may resolve itself into removal of such fluid and appropriate treatment of the underlying choroidal lesion. If, however, there is free communication between the vitreous and the subretinal fluid through a tear, it will obviously be impossible to drain the subretinal fluid and some other method of treatment will have to be resorted to.

For this latter type of case Gonin has used cauterization of the retinal tear with excellent results, according to his published reports. His last series of ten cases showed a marked improvement in somewhat more than a half the number. In some, the field was entirely restored and central vision much increased.

Whether these results can be obtained by others remains to be seen, but his treatment seems rational, in that the hope in cases of tear is to entangle the torn retina in the scleral wound or form other adhesions of these two structures, and red heat suggests itself as most applicable. For cure to be lasting attention to the underlying pathology is also necessary.

The possibility of a serous exudate being the cause of detachment is shown by the fairly ready production of detachment in rabbits by heating the sclera. The retina becomes detached after a few hours, and slowly the detachment, if originally above,

subsides at this point and extends downward to the lower part of the retina, where it may remain for a long time.

Though the idea of opening the sclera and introducing the actual cautery is radical, the hopelessness of these cases without intervention encourages one to perform even a dangerous operation if there is no definite contraindication such as tumor or very low tension, and if there is a reasonable chance of success. *L. T. P.*

GLAUCOMA AND THE ENDOCRINES

In spite of the seemingly endless forward march of modern medicine, one does not have to be a pessimist to assume that some problems of disease will remain forever insoluble. Glaucoma may be one of these, both as to its etiology and as to anything like an absolute power to check its progress in every case.

Apart from the enthusiasms of a few controversialists, how much more do we really know about the anatomic and vital foundations of this disease than was known thirty years ago? Secretion or transudation from ciliary body and iris; drainage through a poorly understood vascular network at the angle of the anterior chamber, through the tissue of the iris, or through lymph channels at the back of the eye; choroidal circulation and venæ vorticosæ; vitreous and aqueous; refractive errors; position of iris root and size of pupil; retinal pigment epithelium; general circulatory factors, including blood chemistry; the behavior of various internal secretions; and perhaps a dozen other fields of investigation not recalled here have been studied and learnedly discussed month after month, year in and year out, in the attempt to explain this variable symptom complex which in the terminology of several thousand years ago we still call glaucoma.

Not so very far behind us are the days when glaucoma and cataract were poorly distinguished one from the

other. The time may come when what we now call glaucoma will prove to be a group of independent diseases with some common symptoms.

Since the foundations of endocrinology were laid by Brown-Séquard in 1889, efforts have been made to trace a more or less intimate relationship between glaucoma and disturbances of the internal secretions. In most of the tissues of the eye there have been encountered lesions which could be shown to have some connection with these secretions. Among such disorders are included the pigmentary dystrophies, tetanic cataract, and various forms of choroiditis, iritis, uveitis, neuritis, and retinitis.

Cucchia (*Annali di Ottalmologia e Clinica Oculistica*, 1928, p. 116) calls attention to the interesting fact that investigations along this line have dealt almost exclusively with the influence of endocrine dysfunction in women; there being a surprising absence of reported cases of ocular affections in men which were regarded as associated with disturbances of the sexual endocrines. This is in spite of the fact that in the male, as in the female, certain harmonic relationships are established along analogous lines at the onset of puberty; and further that in the two sexes the characteristics of senility are regarded as resulting from the involution respectively of the testicle and the ovary, with associated changes of metabolism. It is true, however, that the ovary is subject to periods of greater activity, while the endocrine activity of the testicle is more uniform.

Hertel demonstrated experimentally that extirpation of the thyroid augmented, and that hyperfunction of this gland diminished, intraocular tension. Several authors reported symptoms of glaucoma with myxedema. Experimental results as to the influence of pregnancy upon intraocular tension have not been uniform, some authors failing to discover incidental variations, while others reported either hypotension or hypertension. Glaucoma patients have been reported as subject to acute exacerbations during menstruation.

But several authors have felt, after careful investigation, that no definite conclusions as to the influence of the endocrines upon ocular tension could be arrived at.

Cucchia himself undertook to study the influence upon ocular tension of removal of the ovaries, and also of the subsequent administration of ovarian extracts, either orally or hypodermically. He also studied the effect of administering testicular and ovarian extracts respectively in elderly men and women with normal eyes.

Investigation of eighteen younger women for some time after removal of the ovaries on account of pelvic disorders failed to reveal appreciable variations in ocular tension. The same was true of a smaller group of women whom it was possible to study both before and after castration. Administration of ovarian extracts in castrated women, while it diminished the general disturbances due to castration, failed to modify the ocular tension. In the elderly subjects administration of testicular and ovarian extracts, respectively, did not in general seem to produce a noticeable diminution of intraocular tension.

Any direct relationship between glaucoma and the activity of the sexual endocrine glands seems improbable. So far as an indirect relationship exists, the influence of the endocrine is most likely exerted through incidental disturbances of blood chemistry and vasomotor control, and this is the probable explanation, incomplete though it may be, of the well known influence of emotional upset in initiating or aggravating attacks of glaucoma. A classical example of this was the personal experience of Javal, in one of whose eyes a dangerous attack supervened upon an exciting political campaign in which he was a successful candidate, while the other eye lost ground which it never recovered after the great ophthalmologist had spent a week in following, with the profound interest of a devoted friend, the revision of the famous Dreyfus case by the military court at Rennes.

W. H. C.

SECRETARIES OF OPHTHALMOLOGICAL SOCIETIES

By common consent of the rank and file of the membership, the duties of the secretary of a local medical society are multifarious. He should be willing to work indefatigably behind the scenes, taking very little credit so long as everything goes perfectly, and welcoming an abundance of rather thinly veiled criticism if anything goes wrong. He should have an unfailing familiarity with Roberts' rules of debate, and should memorize the constitution and by-laws of the society for quotation at a moment's notice. He should be ready at all times to prompt the chairman as to the conduct of the meeting, speeding up or slowing down as occasion may indicate. He should see that the program is full enough but not overcrowded. He is often the one who is mainly responsible for the relative success or failure, vitality or somnolence, of the organization.

With regard to many city and state ophthalmological societies of this country and elsewhere, the secretary needs, in addition to his other qualifications, a certain amount of editorial ability. Whether he writes his own records or makes use of those of a paid reporter, he may find himself called upon to send for publication an account of the proceedings in which with reasonable accuracy are combined the advantages of orderliness, selection, and condensation which will render the scientific material presented instructive and readable to the subscribers of an ophthalmological journal.

These qualities demand both ability and training, and are not likely to be developed in their highest measure during the experience of a single season. Such qualities are not likely to be manifested in a valuable degree by any considerable number of the members of each society. Yet a good many societies elect a new secretary every year, and the election sometimes depends more upon personal considerations of a rather trifling character than upon careful choice of the man best fitted for these special duties.

When a good secretary has been found, it is a serious mistake to discard him at the end of a year's service, when perhaps he is just beginning to be thoroughly familiar with the work. Having been selected with care (often as the result of private conference among the older heads in the society rather than upon the basis of "medical politics"), and ripened by experience, a good secretary may with advantage be retained for as long as he is willing to continue his altruistic labors. As regards the publication of the society's transactions in the periodical literature, a secretary should be furnished with the best possible reports from members on subjects discussed or cases brought before the meeting, and he should then be given a very free hand to cut and trim these reports so that they may best serve the interests of the profession as a whole. In this connection it should not be overlooked that some of the most instructive literary material concerning the science of ophthalmology is to be found in the well reported monthly proceedings of local societies.

W. H. C.

BOOK NOTICES

An atlas of stereophotographs of the anterior segment of the eye. Robert Von der Heydt, M.D., and Harry S. Gradle, M.D. Fifty plates and test cards. Oak Park, Illinois. W. M. Graham and Co., 1928.

The value of photography in making case records is established. Its value in teaching, for gaining familiarity and understanding of the appearances of pathologic conditions, is only beginning to be appreciated. For the latter purpose stereoscopic photography is most valuable. Stereoscopic vision is so much more suggestive, or complete, than simple monocular vision, that the time will come when stereoscopic photographic reproductions will be commonly used in books. But until a large proportion of readers have learned to look at such pictures without a special optical apparatus, called a stereoscope, such pictures must be mounted to use

with a stereoscope, to make them generally useful. A collection of such pictures with a description of each constitutes the work before us.

There are fifty such plates in this "atlas," each with its appropriate description on a separate card. The pictures are fine achievements of photographic art. The authors are to be congratulated on their success in this direction, as well as on the wide range of cases that have been thus recorded and reproduced. The text card indicates the condition represented, a brief description of it, and a general idea regarding its prognosis and treatment. It is a most valuable collection for the student, or for the general practitioner confronted by an eye condition with which he is not familiar. It will also be valuable to the isolated ophthalmologist, to keep his conceptions of conditions rarely encountered fresh for comparison with related conditions, or similar lesions that may come to his attention.

In the series are included the following lesions and conditions: lids 6, conjunctiva 9, cornea 18, iris 7, crystalline lens 11, and injuries of the eye 9. They show a wide range of unusual and common conditions; and, when compared with similar conditions encountered in practice, give one the advantages of a larger experience than often falls to the lot of the private practitioner. It is to be hoped that future editions will be demanded and forthcoming. A whole literature of stereoscopic plates, with explanations, would afford a profitable field for study.

E. J.

American Ophthalmological Society Transactions, vol. 25, 1927. Octavo, cloth, 421 pages, illustrated. Published by the Society.

The transactions of this Society grow in value with the lapse of time; not only by the addition of new volumes, but also as an original source of much that is of importance in ophthalmic literature. The abstracts of papers in the present volume indicate but a part of what it is worth to any

studious ophthalmologist. Although this is only the twenty-fifth volume it gives the proceedings of the sixty-third annual meeting held at Quebec, Canada; for the first time outside of the United States. The early volumes of the series each contain the proceedings of several annual meetings. The illustrations in this volume include twenty-five plates, four of them in colors.

The papers already published in the A. J. O., and the abstracts of others to appear in the abstract department, give a good idea of the scientific proceedings of the meeting. They cannot convey the valuable ideas that spring up in the discussions which are reported in this volume. Of the twenty-five papers only twenty-two were discussed, and the average number participating in each discussion was more than three members or guests of the Society. This indicates that the value of these transactions is greater even than that of having important papers at hand for future reference. They are worth more also because the volume contains the membership theses of the active younger ophthalmologists who were admitted to the Society at this meeting. There are also sketches and photographs of three deceased members, William M. Sweet, of Philadelphia; Robert G. Reese, of New York, and Francis A. Lane, of Chicago. Although this society limits its membership there is ample reason that its Transactions should be in the working library of every ophthalmologist who keeps one.

E. J.

Ophthalmological Society of Egypt, Bulletin, v. 20, session of 1927. Paper, octavo, 221 pages, illustrated with 20 plates, 7 in colors. Published by the Society, Cairo, Egypt.

These "Bulletins" must be recognized as part of the ophthalmic literature of the world. This volume is especially important because it contains, with the list of officers, members, etc., an index of papers read before the Society during the first twenty-five years of its existence, and a

photograph of nineteen members of the ophthalmic section of the International Medical Congress held in Cairo in 1902, where this Society was founded. Of the thirty-six papers read before the 1927 meeting, thirty-four are published in English and two in French, while only the remarks of one member in discussion appear in Arabic.

The papers are grouped according to topics, much as they are in the Transactions of the Ophthalmological Society of the United Kingdom. In recognition of the anniversary of the Society's foundation five of them come under the heading "historical". The other topics are: Conjunctiva, cornea, glaucoma, lens, optic nerve, refraction etc., lacrimal, lids, orbit, injuries of the eye, tumors, congenital anomalies of the eye, treatment, and statistical. As illustrating the close touch of these proceedings with western ophthalmology, may be mentioned papers by Dr. M. Sobhy Bey on "Experience with Wheeler's operation for restoration of a contracted socket", and on "Transient myopia in diabetes", by Dr. A. Osborne on "Ocular affections following intranasal operations", and by Dr. El Aquizy Bey on "Headache and other neuroses and their relation to errors in the optic apparatus." *E. J.*

Vitale Färbungen am menschlichen Auge. (Vital stainings on the human eye.) O. Knüsel and P. Vonwiller. 10 colored plates and 36 reproductions in the text. Berlin, 1928, S. Karger. Paper covers, marks 12.00.

This is an assemblage of various papers previously published by the two authors, chiefly in the Zeitschrift für Augenheilkunde. One author (Knüsel) is an ophthalmologist, the other an anatomist. The purpose has been to combine the recent technique of slit-lamp examination with modern histological staining methods. Studies along these lines may take two main directions, namely to render visible normal structures which are not visible without special staining, and to demonstrate changes due to disease.

The volume is divided into seven

main sections: (1) visualization of epithelial and connective tissue cells, lymph vessels, nerves and their end apparatus; (2) methylene blue staining of the cornea; (3) morphology of mucous secretion of the conjunctiva; (4) new means of studying tissues of man and animals (observation of living cells and living tissues in the living organism); (5) lymph vessel studies in the bulbar conjunctiva; (6) microscopic study of the living eye with high magnifications; (7) further studies of staining with methylene blue and scarlet red.

The already broad literature of the subject is carefully surveyed in the text and listed in ample bibliographies. Careful descriptions are given of the technique of the various methods of staining and of examination with the slit-lamp. Especially interesting are the descriptions and illustrations of nerve endings, of the process of mucous secretion, and of the lymphatic circulation. Fifty-three colored drawings greatly enhance the value of the monograph. *W. H. C.*

Über homonyme Hemianopsie. (Concerning homonymous hemianopsia.) E. Bunge. 51 pages. With one plate. Berlin, 1928, S. Karger. Paper covers, marks 2.80.

This is a reprint of part eight of the Abhandlungen aus der Augenheilkunde und ihren Grenzgebieten. The single plate is an ingenious drawing, partly in actual perspective and partly diagrammatic, of the optic tracts in the brain in relation to the eye. Thirty-eight illustrative cases are recorded in appreciable detail. *W. H. C.*

Egypt, Ministry of the Interior, Department of Public Health, thirteenth annual report of the ophthalmic section, 1925. Government Press, Cairo, 1928.

This report (always decidedly late in appearing) reviews statistically and in summary the ophthalmic activities of the Egyptian health department for the year in question. In this issue, the number of permanent ophthalmic hospitals under the administration of the

Egyptian government is apparently shown as having increased from twenty to twenty-two, and the number of traveling hospitals from five to seven. There seems to be an increasing tendency for the native aristocrats of Egyptian municipalities (the "rich notables", to use the phraseology of the report) to provide the funds for the establishment of clinical institutions. The traveling ophthalmic hospitals are referred to as "one of the most important factors that prompt the provincial councils and the notables to subscribe for establishing ophthalmic hospitals in their towns". *W. H. C.*

Ophthalmoscopy, retinoscopy, and refraction. William A. Fisher, M.D. Cloth, 291 pages. 260 illustrations, including 48 colored plates. Philadelphia, F. A. Davis Company.

This is the second edition of this popular book, which has been amplified by the addition of many illustrations, and by a chapter on the newer methods of refinement in ophthalmic diagnosis, written by Dr. Robert Von der Heydt. The author of the book states his belief that ophthalmoscopy and the fitting of glasses (sic!) belong to the general practitioner. If this premise be true, the conclusion is also probably true, viz., that the general practitioner by mastering the methods described and equipping himself with the necessary instruments should be able to correct the common errors of refraction and become proficient in the use of the ophthalmoscope. Indeed, even if the premise be not conceded by ophthalmologists, whose experience would lead them to believe that the domain of ophthalmology is broad enough to demand all of its practitioner's time, mastering the methods and so on will still make the conclusion correct—if the necessary clinical experience is previously or simultaneously obtained.

While it is probably true that it would be possible for a practitioner, by mastering the laws of optics and the methods of skiascopy and refraction as given in this book, to make himself proficient in the prescription

of correcting lenses, the reviewer gravely doubts that any one can become proficient in the use of the ophthalmoscope—if by that is meant ability to see and diagnose abnormal fundal conditions—by the use of any model, or by the study of any textbook, however good the illustrations. Any such means cannot replace clinical experience, only assist it.

This book is well printed, and the information is conveyed in a manner easily understood by the beginner.

C. L.

The coordination of refraction with spectacle and eyeglass fitting. Sidney L. Olsho, M.D. Instructor in Ophthalmology, Jefferson Medical College, etc. Cloth 12mo, 56 pages, 19 illustrations. Philadelphia, Philadelphia Publishing Company, 1928.

This little volume sets forth briefly, but more completely, the ideas put forth in two papers published in this Journal, v. 3, p. 481, and v. 5, p. 718. It is fully justified by the practical importance of its author's views and the comparatively slight attention that has been paid to them by the majority of ophthalmologists. A subtitle explains the subject as "the system of base line refraction employing a new model of the standard type of trial frames."

This system concerns itself with agreement of test lenses and correcting lenses as to precision of cylinder axes, height of optical centers, inclination of lens planes, and distance of lenses from the corneas, vertex refraction. The new ideas are to be applied through modifications of standard trial frames already in general use, without any radical departures in the trial lenses already in common use.

The text could be reproduced in fifteen pages of this Journal, but the illustrations used are equivalent to additional pages of description, and the emphasis of separate publication should attract the attention of readers, and help to bring a better understanding of the optical principles involved, and the value of more exactness in the adjustment of correcting lenses.

E. J.

ABSTRACT DEPARTMENT

Abstracts will be classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

- | | |
|--|---|
| 1. General methods of diagnosis | 9. Crystalline lens |
| 2. Therapeutics and operations | 10. Retina and vitreous |
| 3. Physiologic optics, refraction, and color vision | 11. Optic nerve and toxic amblyopias |
| 4. Ocular movements | 12. Visual tracts and centers |
| 5. Conjunctiva | 13. Eyeball and orbit |
| 6. Cornea and sclera | 14. Eyelids and lacrimal apparatus |
| 7. Uveal tract, sympathetic disease, and aqueous humor | 15. Tumors |
| 8. Glaucoma and ocular tension | 16. Injuries |
| | 17. Systemic diseases, including parasites |
| | 18. Hygiene, sociology, education and history |

1. GENERAL METHODS OF DIAGNOSIS

Meeker, Louise H., and Cook, Ward H. **Methods for preparing gross and microscopic eye specimens.** Arch. of Ophth., 1928, v. 17, March, p. 185.

The authors recommend the following fixation solution for the eyeball:

Zenker's solution	95 c. c.
Acetic acid (glacial)	5 c. c.
Formalin	10 c. c.

They find this preserves the specimens with much less shrinkage and distortion. After two hours in this solution, small windows are cut in the sclera, and the fixation continues for twenty-four hours, after which the specimen is washed in running water for twenty-four hours and then placed in eighty per cent alcohol. Then follows the usual routine.

A second suggestion concerns two procedures for clearing up the thick celloidin blocks that remain after the required sections have been made.

M. H. Post.

Knüsel, O. **Vital staining of the human eye,** fifth communication, Zeit. f. Augenh., 1928, v. 64, Jan., p. 1,

The author uses only methylen blue and scarlet red in aqueous solution. He describes in great detail the findings after staining, as to nerves, vessel walls, and normal and morbid cornea

and conjunctiva; and he reproduces beautiful microscopical pictures in color. The article should be read in the original by workers with the slit-lamp. In the conjunctiva methylen blue brings out epithelial nerves with their end organs. In the blood vessels Rouget cells are made visible and analogous cell of the lymph vessels are also seen. Scarlet red stains morbid and dead epithelial cells of the cornea and conjunctiva. Like fluorescein, it is useful in making pathological processes visible. Local staining of epithelial cells of otherwise normal eyes is often seen in patients who have had tuberculosis or scrofulous processes in the eye.

F. Herbert Haessler.

2. THERAPEUTICS AND OPERATIONS

Asmus, Edward. **Treatment of ocular tuberculosis with tebeprotein (Toeniesen).** Klin. M. f. Augenh., 1928, v. 80, March, p. 302.

Tebeprotein is ten times less poisonous than old tuberculin and its reaction is one hundred times more sensitive. The initial dose is 1/10 mg. in 1 c. c. solution no. 1. The solution remains good for a year. Out of twenty cases, seventeen, i.e. 85 per cent, were cured; one was improved; one remained on a good level; one was not influenced. The clinical histories are given in detail and show that tebeprotein deserves

a prominent place in the treatment of ocular tuberculosis. *C. Zimmermann.*

Beauvieux and Dupas, J. **A topographical, anatomical, and histological study of the ciliary ganglion in man and other animals.** *Arch d'Opht.*, 1926, v. 43, November, p. 641.

Dissections and measurements of the situation of the ciliary ganglion were made on eighty subjects. The ganglion was found to be situated on the external side of the optic nerve about five mm. anterior to the sphenoidal fissure. The danger of operative procedures was emphasized in view of the close relation of the ganglion to the important ophthalmic vessels. In man the ganglion cells are multipolar and of the character found in the sympathetic ganglions. In the dog and cat the cells are also multipolar but in the pigeon they are unipolar. Some excellent illustrations accompany the article. *M. F. Weymann.*

Bentzen, Chr. F. **General light-bath treatment of some diseases of the eyes.** *Acta Ophth.*, 1927, v. 5, no. 1, pp. 29-38.

After seven years of observation Bentzen concludes that general light therapy is not a specific treatment for definite ocular conditions, but that in cases of constitutional eye disease a favorable effect in the general condition, and therefore the eyes, may be observed. Iridocyclitis, especially of the tuberculous type, is usually improved, as is also severe phlyctenular disease. *E. M. Blake.*

Elschnig, A. **Technique for opening eyeballs with shallow anterior chambers.** (1 ill.) *Klin. M. f. Augenh.*, 1928, v. 80, March, p. 382.

After forming a conjunctival flap close to the corneal margin this is drawn back onto the cornea. Close to the scleral margin of the limbus, about 1.5 millimeters from the transparent margin of the cornea, by slow dissection an incision of from six to seven millimeters is made through the limbus (as originally suggested by Gayet in 1884). If there is any hemorrhage the section is made from stratum to stra-

tum and the hemorrhage checked with adrenalin sponges. From the first perforation through which the aqueous may slowly escape the wound is enlarged with the inverted knife. Thus injury of iris and lens is avoided. Elschnig has completely discarded peripheral iridectomy in glaucoma in favor of total iridectomy.

C. Zimmermann.

Jickeli, Carl. **Further experiences with nonspecific intracutaneous aolan therapy in ocular affections.** *Klin. M. f. Augenh.*, 1928, v. 80, Feb., p. 221.

Jickeli had very good results with intracutaneous injections of aolan in iritis, cyclitis, scleritis, keratitis (but not luetic parenchymatous keratitis), recent choroiditis, albuminuric retinitis, and nontraumatic detachment of the retina in nonmyopic eyes, and in irritations after operations opening the eyeball. Diseases of the conjunctiva, especially blennorrhea, tuberculous and luetic affections, suppurative keratitis, and degenerative processes and diseases of the adnexa are excluded. Intervals of from three to four days and at least five injections are necessary to form a judgment as to the effect. General disturbances, especially fever, were never observed. Occasionally the patients complained of fatigue, but these were cases of previous asthenia.

C. Zimmermann.

Kugelberg, F. **A simple way of anchoring the globe in minor eye operations.** *Acta Ophth.*, 1927, v. 5, nos. 1-3, pp. 106-109.

Kugelberg suggests a modification of Angelucci's method of fixing the globe in downward rotation. The tendon of the superior rectus is grasped, a long slender needle passed underneath, and the ends of the needle allowed to rest against the speculum. Its employment is risky in cataract operations but helpful in minor surgical procedures, and especially where general anesthesia is employed and the eyeball rotates upward. *E. M. Blake.*

Pagani, M. **As to fixation of the globe at operation.** *Arch. f. Augenh.*, 1927, v. 98, May, p. 168.

Pagani claims for Larghi priority in fixation of the globe by a suture through the superior rectus muscle. Larghi described this in 1858 in the *Gazette Médicale de Paris*, the only difference in detail being lack of the modern type of needle and suture material.

F. C. Cordes

Rohner, Margrit. **Accidents from subconjunctival injection of salt solution; due to local hypersensitivity?** *Klin. M. f. Augenh.*, 1928, v. 80, Feb., p. 228.

Three cases described showed an unusual reaction after subconjunctival injection of hypertonic salt solution. It did not occur after the first injection, but at the beginning of a second or later injection, and consisted in chemosis and diapedetic hemorrhages, which receded in the first case within three weeks, in the second and third within a few days. The interval between the injections was five years in the first, and several months in the second and third cases. Infection could be excluded, although distilled water always contains minimal quantities of bacteria. Only entirely fresh aqua bidestillata is theoretically absolutely sterile. The author attributes the reaction to hypersensitiveness, which, however, has not been found in experiments on animals. *C. Zimmermann.*

Sanders-Larsen, S. **Treatment of tuberculosis of the eye with sanocrysin.** *Hospitalstidende*, 1928, Jan. 5, v. 71, pp. 1-12.

The author reports the results of injections of sanocrysin in tuberculosis of the eye. All the cases reacted generally and locally to tuberculin. The cases which reacted strongly to tuberculin seemed most favorable for the use of sanocrysin. The latter was used in dosage of 0.01 gram increasing to 0.05 gram, given every eight to ten days. Most of the patients had been treated by other methods without results before sanocrysin was used. Thirteen case reports were given; with only one exception there was definite improvement, and in some a most

astonishing recovery, both local and general, took place. The author concludes that sanocrysin is a useful means of treatment of tuberculosis of the eye, that it is indicated in the more chronic types, that in proper dosage its use is not followed by weakening reactions, but that in doses larger than 0.05 gram albuminuria and other toxic symptoms may occur.

D. L. Tilderquist.

Stock, W. **The uses of radiation in treatment of diseases of the eye.** *Med. Klin.*, 1928, v. 48, Nov., p. 1834.

The reaction of the different diseases of the eyes to different forms of light-ray therapy is discussed, and the reaction of the different tissues is given, with the estimated dosage. The use of the rays from infra-red to ultraviolet is discussed, and also the different lamps, together with radium and roentgen treatment. The author especially recommends roentgen treatment for tuberculous scleritis, sclerokeratitis, tuberculous conjunctivitis, dacrocystitis, and infected tissues after sac operations. *Beulah Cushman.*

Stoewer, E. **Gold treatment of tuberculous eye affections.** *Klin. M. f. Augenh.*, 1928, v. 80, March, p. 293.

Six cases reported were treated with krysolgan (Schering) and tryphal (Farbwerken Höchst a. M.), beginning with injections of 0.01 increasing gradually up to 0.025, and finally 0.05. Cases with general tuberculosis of the glands and those in which a preceding tuberculin cure did not have the desired effect are adapted for treatment with gold. Where tuberculin is effectual, gold preparations are not needed. For some resistant cases surprising results may be obtained. *C. Zimmermann.*

Van Lint. **Palpebral akinesia.** *Arch. d'Opht.*, 1926, v. 43, Dec., p. 714.

The objections made to the use of akinesia, namely, edema of the lids and corneal ulceration due to exposure, are the result of improper technique. By putting a drop of sterile oil in the eyes and seeing that the lids are closed

when the dressing is applied the prevention of corneal ulcer is accomplished. The following technique used for the injection does not cause edema of the lids. Fifteen minutes before the operation four c. c. of two per cent novocain containing three drops of adrenalin is injected with a fairly coarse three cm. needle. The first puncture is made at the intersection of a horizontal line 0.5 cm. below the lower orbital margin with a vertical line passing 0.5 cm. to the temporal side of the outer orbital margin. The needle is passed down to the bone and a drop of solution injected. The needle is slightly withdrawn and passed toward the nose along the horizontal line, and at intervals of a half centimeter injections are made with the needle forced down against the bone, until 1.5 c. c. is injected. The needle is then almost withdrawn and is directed upward until it is opposite the outer canthus and a half centimeter to the outer side of the orbital rim. Here a deep injection of one c. c. is made. The needle is withdrawn and a new puncture made at about the level of the brow and in line with the external rim of the orbit. The needle is directed downward and slightly outward and 1.5 c. c. is injected, following the bone with the point of the needle to the level of the external canthus. In this manner all injections are made right down on the periosteum and the lids are not infiltrated.

M. F. Weymann.

Yudkin, A. M., Krause, A. C., Morton, D. G. **The experimental transmission of arsenic to the aqueous humor.** *Arch. of Ophth.*, 1928, v. 17, March, p. 147.

The work reported in this paper was done on the eyes of dogs. It consisted in tapping the anterior chamber before and after the injection into the jugular veins of large doses, 50 milligrams per kilogram body weight, of neoarsphenamine, dissolved in freshly distilled water. The authors found that only the minutest amount of arsenic penetrates to the aqueous humor, but that paracentesis of the anterior chamber, whether done before or after the injection,

greatly increases the amount found at the next tapping, and that this increase can be maintained by further tapings. This they explain on the grounds of decreased intraocular pressure and increased hyperemia of the ciliary body. The increase, however, remains only a few hours.

The authors found, in addition, that pilocarpin and eserine instilled into the eye increased the arsenical content of the aqueous humor. They, therefore, feel that paracentesis of the anterior chamber and the instillation of pilocarpin or eserine at or near the time of injection of the arsenical might be of definite therapeutic value in the treatment of luetic infections of the eye.

M. H. Post.

3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Adrian and Matthews. **Action of light on the eye. Part 1. The discharge of the impulse in the optic nerve and its relation to the electric changes in the retina.** *Jour. of Phys.* 1927, v. 63, p. 378.

1. Although considerable work has been done on the retinal currents there have been practically no investigations on the action currents of the optic nerve itself. These experiments deal with the action currents in the optic nerve of the eel *conger vulgaris*. The apparatus consisted of an arrangement by which an image of varying size and intensity of illumination could be focused accurately on the eye and the time relations of the action currents in the nerve measured accurately with a capillary electrometer and an amplifying system. Sudden exposure of the eye to light of moderate intensity always produces a well marked action current discharge. The average duration agrees with that of the response in a peripheral sensory nerve fiber, and no sign was found of any general change in the magnitude of the response corresponding with changes in intensity of the stimulus. In other words, there is an "all or nothing" relation between the impulse and the stimulus, as in the sensory fibers from other receptor organs.

The discharge begins after an appreciable latent period, rises rapidly to a maximum, and then falls slowly. When the light is turned off there is a sudden increase in frequency and then a drop to zero. The decline in the frequency of the discharge is probably analogous to the diminution in intensity of a constant stimulus, since even a bright light soon becomes hazy when complete fixation is maintained. This is exactly similar to the discharge along other sensory nerves from peripheral receptor organs when exposed to a constant stimulation. In the peripheral receptors this decline in frequency has been related to the adaptation which occurs when a nerve fiber is stimulated with a constant current. In the nerve fiber the adaptation to the stimulus is so rapid that only one impulse is produced. It is slower in the skin receptors and very slow in the receptors in the muscles which are concerned with the long continued postural reflexes (proprioceptive). Whether the decline in the discharge from the eel's eye is due to adaptation or to fatigue cannot be decided for the present. Its functional importance is clear. It means that a changing visual field will produce a greater sensory effect than a stationary field.

When the intensity of the illumination is increased without any change of area three changes occur:

- (1) The latent period is diminished.
- (2) The maximum frequency of the discharge is increased.
- (3) The maximum frequency is reached after a shorter interval than at the beginning of the discharge.

The effect of increasing the size of the retinal image without altering the intensity of the illumination was found to be exactly similar to the above changes. The change of latent period with area is either absent or very slight when the diameter of the retinal image exceeds one mm. It is greatest when the diameter is reduced below 0.3 mm. It is obvious that these facts do not agree with the simple conception of the retina as a mosaic of sensitive points each connected with its own nerve fiber and each acting inde-

pendently of the rest. The shortening of the latent period when the size of the retinal image is increased can only be explained on the assumption of some kind of interaction with the different stimulated points. These unexpected results the authors believe should be anticipated because of the fact, known for many years, that in the human eye the threshold intensity of illumination for small areas varies with the size of the area.

2. The retinal currents: An analysis of the changes in potential which occur between the front surface of the cornea and the back of the eyeball have been described by Einthoven.

The present authors measure the time relations between the retinal effect and the optic nerve discharge and show that the two are quite distinct. There is a constant interval between the beginning of the A effect and the beginning of the optic nerve discharge. Since there are two synaptic layers intervening between the retinal elements and the fibers of the optic nerve, there is ample reason to expect a delay in conduction, but it is of great interest to find that this delay is constant and that the changes of latent period are all due to the process which expresses itself as the retinal effect. It is possible that the seat of the retinal effect is in the rod and cone layer and not in the synaptic network and that the constant retinal nerve interval is due to the conduction through the latter. Hecht's evidence strengthens this view. An attempt is made to explain their inability to confine the impulse discharge to a single fiber of the optic nerve and to explain the changes in the time relations with changes in area and light intensity.

Francis H. Adler.

Adrian and Matthews. **Action of light on the eye. Part 2. The processes involved in retinal excitation.** *Jour. of Phys.*, 1927, v. 64, p. 279.

In this paper the authors are concerned with the initial stages of the process, that is, the exception of the retinal elements studied by means of short flashes. The retinal nerve inter-

val remains constant not only for exposures of long duration but for short flashes as well. When the flash is reduced in time they find an increase in the reaction time, and since the retinal nerve interval remains constant this increase in reaction time as the flash is reduced is due to an increase in the time taken by the process which leads up to the retinal response. The processes intervening between the retinal response and the nerve discharge (e.g. synaptic delay, etc.) are unchanged.

For short exposures the stimulating effect judged by the optic nerve discharge depends simply on the total quantity of light received by the eye. This agrees with the relation found in man between the quantity of light received in a flash and the brightness of the resulting sensation (McDougall, *British Journal Experimental Psychology*, 1904, page 168).

The quantity relation gives some clue to the processes involved in the action of light on the retina. With a brief flash the response begins some time after the light has ceased to act, and it begins sooner or later according to the quantity of light received. We have therefore two processes to consider, a primary change coinciding with the exposure and a slower secondary change following on the primary change and ultimately producing the response. The primary change produces something which we may call the "light product" or "light effect" and the amount of light product is directly proportional to the quantity of light in the flash. The rate of the secondary change is determined by the amount of light product and when it has progressed to a definite extent the retinal response begins. This is merely a restatement of the results and involves no assumptions as to the nature of the changes.

These changes are discussed on the basis of Hecht's scheme for the light reactions of Mya and Ciona, and agree in the main with his.

Francis H. Adler.

Blegvad, Olaf. **The prognosis of excessive myopia.** *Acta Ophth.*, 1927, v. 5, no. 1, pp. 49-77.

A Danish clinic material of 53,000 studied by Blegvad showed 4.99 per cent cases of myopia. Of these, 3.58 per cent were in men, 6.28 per cent in women and 4.85 per cent in children under sixteen years. The percentage of high myopia (over six diopters) was 1.14 for men, 2.64 for women, and 1.28 for children. Blegvad found that the earlier the myopia appeared the greater the likelihood of its becoming excessive, and that the complications increased with the degree of myopia. In spite of the fact that more men than women do close work, there is a greater tendency to rapid increase in the latter. The myopia practically always ceased to progress by the age of twenty years. *E. M. Blake.*

Gellhorn, E. **On the antagonism of after images**—6th communication. *Pflügers Arch. f. d. ges. Phys.*, 1927, v. 218, p. 54.

By means of three different experimental procedures the author has studied the antagonism of after images as follows:

(1) A cross composed of two different colors with a central gray portion serving as a fixation point is fixed binocularly for one minute. The after image is observed on a gray surface. It shows an antagonism between the two different colors of the cross, which is marked the more the two colors differ from one another in intensity or quality. By placing the cross on backgrounds of different brightness it is shown that that color predominates in the after image which had the greatest difference in brightness from the background. A fixation period of twenty seconds is the most favorable for observing this antagonism. If the period of fixation is longer the after image persists but the antagonism is absent.

(2) By means of a stereoscope the two eyes are exposed to objects of different color, size, and so on. At the end of one minute the antagonism of the after image is registered binocularly without the stereoscope. This antagonism is shown equally by stimulation of homologous or nonhomologous parts of the retina.

(3) This is similar to No. 2 save the fact that the observation of the after images is made monocularly. This results in a complicated phenomenon which the author terms the i phenomenon, and for details of which the original must be consulted.

Francis H. Adler.

Hertz, Hans. **A new formula of the fundamental relations of the optical system.** *Acta Ophth.*, 1927, v. 5, no. 1, pp. 137-143.

An article on optics, full of formulæ, and interesting principally to the optical physiologist. Not adapted to abstracting.

E. M. Blake.

Holm, Ejler. **Prophylaxis of myopia.** *Hospitalstidende*, 1928, Feb., v. 71, pp. 110-117.

Holm emphasizes the limitation of near work among school children and students as the most important means of preventing myopia. The facts of myopia seem to fit very well the theory that the tonus of the ciliary muscle is the regulator of the growth of the eyeball. If this tonus is increased by excessive use of the eyes for near, there is a corresponding disturbance in the development of the eyeball and hence myopia. In the schools of Copenhagen, the students who take the language courses develop a definitely higher percentage of myopia than do those taking the scientific courses, respectively 43 and 32 per cent; the language courses calling for much reading. Improvement of the general health is also a factor in the reduction of myopia. That preventive measures are effective is shown by statistics from Sweden, where in the eighties 50 per cent of those attending school developed myopia, while late reports show that only twenty per cent have acquired myopia.

D. L. Tilderquist.

Kestenbaum, Alfred. **Monocular and binocular visual acuity.** *Zeit. f. Augenh.*, 1927, v. 63, Oct., p. 159. (See Section 4, Ocular Movements.)

Peiper, Albrecht. **On the sensitivity of premature infants to brightness and color.** *Arch. f. Kinderh.*, 1926, v. 60, part 1, pp. 1-20.

The author cites the experiments in the literature for the purpose of determining color vision in infants, and shows the errors in the methods used. In any method for the determination of color vision the brightness value must be carefully controlled. He assumes that, if the brightness values of different colors in the light adapted infant correspond to the same values obtained in adults, and if during dark adaptation the Purkinje phenomenon is present, proof is established that the infant possesses a color sense corresponding to normal adult vision.

In order to test this out the author examined a series of premature infants, making use of a reaction to different colored lights which he had previously described. When a light falls suddenly on the eye the head is drawn backward. This eye reflex is dependent on the light intensity. By means of Tscherning's photometric glasses he determined the reaction values for different colored lights of varying intensities in light adapted and dark adapted infants. He found that the light adapted infants possessed the same brightness values for red, yellow, green, and blue as adults. Further, the sensitivity to light of different wave lengths increases considerably with dark adaptation, and the shift in the brightness values of colors toward the violet end during dark adaptation was well shown.

He concludes, therefore, that even in the premature infant color vision is relatively similar to that of the adult. Since scotopic vision is present in infants he concludes that the rods must be functioning at this early date.

Francis H. Adler.

Kistler, Robert. **Investigations on the refraction of 105 dogs, with remarks on senile changes in the eyes of dogs.** (1 ill.) *Klin. M. f. Augenh.*, 1928, Feb., v. 80, p. 181.

These examinations were made by Vogt with the ophthalmoscope and ophthalmometer after instillation of one per cent homatropin and two per cent cocaine into the right eye in each case. The results are arranged in tabular form. The average total refraction

of all the dogs was $+0.3582$ D., and that of those older than one year -0.057 . In three dogs lenses with double focus were found, a senile phenomenon, with a nucleus of increased opacity. Myopic refraction of greater amount is, contrary to other assertions, very rare. If there is myopia it is chiefly lenticular, as found in senile dogs with lenses of double focus. The refraction of the cornea in the dog depends upon age and size of body of the breed. Young animals have a larger corneal refraction, larger species a lower than small species.

Senile cataract, lens with double focus, and senile degeneration of the macula have by these investigations been demonstrated for the first time in senile dogs. *C. Zimmermann.*

Larsen, H. **A case of transitory hyperopia in latent diabetes.** *Acta Ophth.*, 1927, v. 5, nos. 1-3, pp. 210-212.

Larsen's patient showed an increase of hyperopia of 2.25 diopters within a few days. The urine was free of sugar but there was a definite increase of the blood sugar. Proper dietetic care led to improvement of the diabetes and a permanent return to the original refraction. *E. M. Blake.*

Schlapfer, Hans. **Experiments in the absorption of infrared by the aqueous humor, lens, and vitreous of cattle.** *Graefe's Arch.*, 1927, v. 119, p. 22.

The minimal absorption by aqueous humor, lens, and vitreous lies at the wave lengths of 750 to 850 millimicra. As to all three of the ocular media, total absorption is practically obtained by a thickness of 10 mm. at a wavelength of about 1500 millimicra. For thicknesses of the different media corresponding to those in the human eye, the vitreous absorbs the most and the aqueous the least of the infrared energy. For a uniform thickness, the infrared absorption by the lens is greatest, namely for rays between 700 and 1250 millimicra, and that for the aqueous humor is least, namely for rays between 700 and 1100 millimicra. It is understood that of all the transparent

media the lens is most injured by short-wave infrared rays.

H. D. Lamb.

Thorner, W. **A reflexless refractometer.** *Arch. f. Augenh.* 1927, v. 98, Sept., p. 388.

Thorner describes a refractometer in which he has combined the instrument of Schweigger with the principle of the reflexless ophthalmoscope.

E. C. Cordes

Vernon, M. D. **The movements of the eyes in reading.** *Brit. Jour. Ophth.*, 1928, v. 12, Mar., p. 130.

The writer summarizes the work of numerous observers. The result of much of this work is arranged in tables. Only during the backward sweep of the eyes in reading is the movement smooth and regular. The forward movement is by a series of jerks and pauses which are greatly influenced in length and number by the character of print, length of lines, subject matter read, and whether the subject is a youth or adult. To illustrate: Schmidt found in a series of adults that reading a line 9 cm. in length showed a mean number of fixation pauses of 6.5, while the number of words read for fixation ranged from 0.93 to 2.15, and the mean duration of pauses was 0.308 seconds.

The mature reader examining the context rather than analyzing the material, style, grammar, etc. shows the most smooth and regular type. Regressions and refixations are much influenced by beginning to read a passage and by print irregularly arranged, and are more noticeable in slow than rapid readers. Lines of print of moderate length (8.5 cm.) are the least fatiguing, thus affording a smoother, more regular reading. These movements, though differing for different individuals, show a number of general similarities, particularly for the best readers, whose movements are regular and fixations few and short. It is probable that the nature of the movements is dependent to a considerable extent upon the central processes connected

with the assimilation of the meaning and comprehension of the material read. But the movements can nevertheless be regulated both by direct training in the physiological processes, and also by means of the printing and general lay-out of the material read.

D. F. Harbridge.

4. OCULAR MOVEMENTS

Discussion on nystagmus. Trans. Ophth. Soc. United Kingdom, 1927, v. 47, p. 1.

In an opening paper B. Chavasse divided nystagmic movements into jerking and smooth; after which terms like unilateral, associated, latent, horizontal, torsional and their opposites were permissible. Nystagmus may be considered as a disease, a symptom, an adaptation, a habit, or a neurological phenomenon. As a symptom it brings up questions of irritative or destructive lesions and their location. In adaptation, as for seeing in dim light, it differs in degree from normal slight movements. As a habit it needs thorough treatment. Its basis is essentially an obstacle to normal complete vision, producing a struggle between physiologic actions.

H. E. Jones based classification on the nerve tracts participating in the nystagmic movements. Pure "ocular nystagmus" is a pendulum movement to and fro at equal speed. Even with vision improved by corrected refraction, it generally continues throughout life. Railway or normal nystagmus is induced by watching objects from a moving car, or a revolving drum in the laboratory. The eyes move to watch one object, then quickly revert to their position to watch another. Miner's nystagmus, excluded from this discussion, was referred to for comparison, as having to and fro movements of equal speed. In vestibular nystagmus the direction of the movements are related to the planes of the semicircular canals. Pontine and cerebellar nystagmus is essentially a conjugate movement dependent on the integrity of the tracts involved.

Gordon Holmes believes that the cerebral cortex and forebrain play no

important part in nystagmus, as seen clinically. Nystagmus due to acute lesions of the vestibular nerve is generally transient. On the other hand nystagmus due to lesions of the vestibular nuclei and parts closely related to them are the usual cases seen by the neurologist. Nystagmus is present in almost every case of cerebellar tumor, hemorrhage, softening; and was noted in the great majority of gunshot wounds of the cerebellum seen by Holmes in the late war. Fixation nystagmus may persist as long as accurate fixation is sustained. Speaking as an aural surgeon, Sydney Scott holds that nystagmus observed only when the visual axes deviate beyond the binocular field is of no otological significance. In labyrinthine nystagmus the slow phase is the primary phase, and yet it is customary to designate the direction by the rapid or secondary phase. Nystagmus with diplopia does not receive the attention it merits. A medical man had three severe attacks caused by a plug of cerumen in contact with the drum membrane. *E. J.*

Göthlin, G. F., and Raab, Nils. **Studies of impressions of movement obtained by production of eye movements by means of a galvanic current.** Upsala Läkareförenings Förhandlingar, 1928, v. 33, pp. 505-514.

This article is highly technical and is unsuitable for abstract.

D. L. Tilderquist.

Kestenbaum, Alfred. **Monocular and binocular visual acuity.** Zeit. f. Augenh., 1927, v. 63, Oct., p. 159.

The act of fixation consists of nystagmus-like movements of smallest amplitude. The smaller the amplitude the better is the fixation and, as visual acuity is a function (in the mathematical sense) of the fixation, the smaller the amplitude of the fixation nystagmus the better is the acuity of vision. The stimuli of the fixation nystagmus originate in the fovea and the author assumes that the stimuli from the two fovea act conjointly and increase the binocular visual acuity over the monocular by decreasing the

amplitude of the nystagmoid oscillations. The discussion is based on data which he elucidated elsewhere several years ago.

F. H. Haessler.

Roelofs, C. **Latent nystagmus.** Arch. f. Augenh., 1928, v. 98, Jan., p. 401.

In reporting three cases of latent nystagmus, Roelofs regards as the primary cause that reflex mechanism which controls the fixation of the globe in the orbit. Probably the most important factors are musculosensory and light stimulations. Another important factor is insufficiency of the external rectus, this insufficiency being a lack of reflex tonus rather than a partial paresis. The condition of latent strabismus is a similar one. When the reflex mechanism of orbital fixation of the globe is well developed, the possibility of these two conditions is greatly reduced. Bilateral retinal stimuli in fixation produce a correction in both instances as this higher reflex overcomes the deficiency of the lower ones. The problem of latent nystagmus is still unsolved. What the disturbance is or its exact location is as yet unsolved.

F. C. Cordes.

Rönne, Henning. **On the mechanics of the squint operation.** Arch. of Ophth., 1927, v. 56, Sept., p. 428.

Following a tenotomy the muscle tenotomized becomes reattached to the eyeball somewhat farther toward the posterior pole. The opponent will then shorten sufficiently to balance the tension of the tenotomized muscle. The two muscles will have shortened to an amount equal to the recession, and either one to one-half the amount, which can be proved by the resulting correction. Postoperative insufficiency arises from faulty reattachment of the tendon of the tenotomized muscle to the globe.

The correlation between hypermetropia and esotropia may be explained by the fact that active shortening of the interni must have a tendency to pass over into a passive shortening, or, in other words, a dynamic squint passes over into a static one, and this

in turn explains the fact why the correction of the hypermetropia does not immediately produce a correction of the squint.

The percentage of secondary squint is constant for all ages, and there is no reason on this account for postponing the operation until a later age. In advancements combined with tenotomy an additional problem presents itself, dependent upon the reaction produced upon the previously performed tenotomy by the method used for advancement. Owing to the fact that the tension in the loop of muscles formed by the internus and externus must increase with the shortening of the externus, an increase of the recession space occurs, with an increase in the total effect of the operation. The effect of the combined operation will be greater than the total of the separate effects of the two operations together. If the advancement sutures include a considerable piece of the conjunctiva nearer the cornea, the pull will result in the closing of the insertion wound made for the tenotomy, and the tendon will also be pulled forward toward its former point of insertion, lessening the effect of the operation. The advancement sutures should, therefore, be placed in the neighborhood of the former point of insertion of the muscle. Postoperative pain is greater when the tenotomized muscle is pulled forward in this manner.

The author considers the result upon the elevation in visual axis produced by unsymmetrical position of the two advancement sutures. If one of the sutures is laid in the conjunctiva above or below the cornea a tightening fold will form in the conjunctiva above the edge of the cornea, and this will rotate the cornea.

M. H. Post.

Vernon, M. D. **Methods of recording eye movements.** Brit. Jour. Ophth., 1928, v. 12, Mar., p. 113.

In this contribution the author summarizes the various methods introduced for the purpose of recording and measuring rapid, irregular, jerky movements of the eyes during normal reading. These methods subdivide them-

selves into the direct and indirect. In the former a record is made by direct observation by means of telescope, ophthalmometer, and microscope. The latter method depends upon photography of the reflection of light from the apex of the cornea or some small object attached to the cornea, or the tracing of a lever attached to the cornea or eyelid. In the photographic method artificial illumination lends itself better to control. The recording lever method requires much less apparatus, but the doubtful accuracy, possibility of eye injury and weight of the lever are disadvantages.

It is very improbable that anything more than the approximate number and the general character of the fixation pauses and eye movements in reading can be observed directly, even through a telescope. The pauses last on the average only about 0.2 seconds and the movements 0.04 seconds each. Possibly very unusually long pauses and regressive movements might be noted in this way, even if they could not be measured. The photographic method, as used by Dodge, C. T. Gray, and Miles and Shen, has proved the most completely satisfactory, though it is probably difficult to manipulate, and requires expensive apparatus.

D. F. Harbridge.

Wiedersheim. **Technique of observation and representation of the path of oscillations in miner's nystagmus.** (1 ill.) *Klin. M. f. Augenh.*, 1928, v. 80, March, p. 380.

Wiedersheim attached a diaphragm to the small illuminating lamp of the arc of the corneal microscope. For recording very small excursions of the eye, he employed a contact glass into the center of which was fused a slender rod, at the front end of which was a glass bead backed by a silvered mirror. The point of light being reflected from the glass bead, the path of the operations is magnified. *C. Zimmermann.*

5. CONJUNCTIVA

Adamantiadis, B. **Furrow keratitis in trachoma, with Weeks's bacillus.** *Ann. d'Ocul.*, 1928, v. 165, Feb., pp. 119-129.

Six cases are reported of a keratitis occurring in trachoma patients in which the characteristics were horizontal furrows and a constantly present Weeks's bacillus. The author believes this to be a condition sui generis. He describes the condition of the cornea in detail. Treatment was cauterization with silver nitrate, instillations of pilocarpin, and a pressure bandage. In every case there was general malnutrition. *L. T. P.*

Castello, B. **Clinical contribution to the study of pemphigus.** *Ann. di Ottal.*, 1927, v. 55, May-June, pp. 405-411.

The author's patient, a man of twenty-five years, had undergone a generalized bullous eruption with severe systemic symptoms eight months before. Three months before, during a recurrence of the cutaneous eruption, bullæ had appeared on the face, and on the mucous membranes of the pharynx and conjunctiva. The conjunctiva showed intense hyperemia, with cicatricial bands between the lids and bulbar conjunctiva. The corneæ were clear, but with small areas of epithelial erosion. Vision was 8/10 and 7/10. In spite of treatment by autoserum, glandular extracts, quinine, arsenic, iodides, and the salicylates, the course of the disease was not modified, and death occurred after about five months. Corneal ulcers occurred, both corneæ becoming covered by dense scar tissue, and vision being reduced to light perception. A review of the histologic findings in reported cases leads to the conclusion that the essential lesion is not the formation of bullæ, but the inflammatory changes in the subepithelial layers, with resulting scar formation. The shrinking of the fornices is not due to adhesions between raw surfaces deprived of epithelium, but to the contraction of the scar tissue with which the entire thickness of the conjunctiva is replaced. Treatment is without effect on the course of the disease, and must be purely symptomatic, directed to relief of the pain and dryness of the conjunctiva. Exceptional cures which have been reported have probably not

concerned true cases of pemphigus but other conditions clinically resembling it. (Bibliography.)

S. R. Gifford.

Dejean and Temple. **Conjunctivitis, with Vincent's spirillum.** *Ann. d'Ocul.*, 1927, v. 164, March, pp. 198-201.

A case of unilateral conjunctivitis lasting six months, with periods of remission, a persistent sensation of burning, and lardaceous concretions, is described by the authors. Vincent's organisms were found, and the condition yielded to zinc sulphate treatment. An unidentified gram-negative coccus was also isolated in small numbers.

L. T. P.

Duverger, C. **Extirpation of pterygium and transplantation of buccal mucous membrane.** *Arch. d'Opht.*, 1926, v. 43, Dec., p. 705.

The recurrence of pterygium after removal by any of the present methods prompted the writer to use a graft from the inside of the lower lip. This has proved entirely satisfactory in the prevention of recurrences, but the cosmetic affect was somewhat impaired due to the red color of the graft. The technique used was to shave the pterygium cleanly off the cornea with a Graefe knife and extirpate the base with the scissors. A thin strip of mucous membrane from the inside of the lower lip was held in place over the denuded area by suturing it to the conjunctiva. The bandage was removed on the third day along with the sutures.

M. F. Weymann.

Fodor, G. **Relation of swimming pool conjunctivitis to trachoma.** *Zeit. f. Augenh.*, 1927, v. 63, Oct., p. 150.

The author considers the epidemic conjunctival affection recently occurring in large cities as a subacute form of the disease which, when it occurs acutely, is called inclusion-body blennorrhoea of the newborn, and, when chronic, trachoma.

F. H. Haessler.

Lyritzas, D. **Therapy in pterygium.** *Arch. f. Augenh.*, 1927, v. 98, May, p. 175.

To avoid corneal scarring, and also recurrence of the pterygium, Lyritzas separates the head of the pterygium from the cornea by means of a probe passed under the neck, and he advocates excision rather than transplantation.

F. C. Cordes.

Stange, H. **Experiences with intravenous copper in trachoma.** *Arch. f. Augenh.*, 1927, v. 98, May, p. 178.

Stange reports seven cases of trachoma treated by intravenous injection of copper and ammonium sulphate, as advised by Meerhoff, with definite improvement. He began with 0.5 c. c. of a fresh 4 per cent solution. This was gradually increased to five c. c. a day. Because of possible coagulation of the blood, with subsequent lung embolus, this medication must be used with caution.

F. C. Cordes.

Taborisky, J. **The occurrence of Provaczek-Halberstädt corpuscles in the ocular conjunctiva.** *Klin. M. f. Augenh.*, 1928, v. 80, March, p. 332.

Taborisky considers the proof of inclusions in the ocular epithelium, especially at the limbus, as pathognomonic for initial trachoma. In initial trachoma he found the inclusions at the limbus in ninety-seven per cent, in the sclera in ninety-five per cent. They can be proved to be present in the limbus epithelium from two days to five weeks, in the scleral conjunctiva up to two months according to the gravity of the disease. In older trachoma the inclusions are no longer found in the limbus epithelium.

C. Zimmermann.

Vancea, P. **Consideration of some rare clinical forms of severe streptococcus conjunctivitis.** *Arch. d'Opht.*, 1926, v. 43, Dec., p. 724.

Two original case reports of streptococcus conjunctivitis in infants are given. It is emphasized that the streptococcus is not normally found in the

conjunctival sac but when present gives rise to a severe pseudomembranous inflammation. The first patient showed a tendency toward a chronic course upon which treatment had little affect. The case was complicated by septicemia. The second patient showed an acute rapid process in the eye, with resultant panophthalmitis. The general condition of this patient remained good. A review of the literature is given.

M. F. Weymann.

Verryp, C. D. and Halbertsma, K. T. A. **Two cases of Parinaud's conjunctivitis.** Brit. Jour. of Ophth., 1928, v. 12, Feb., p. 79.

The authors remark that such varied conditions are named as this disease that it is evident that the malady is not sufficiently well defined. Reference is made to descriptions and findings by Parinaud, Pascheff, Rolandi, Morax, and Verhoeff. Clinically and historically the two cases here recorded resemble more closely Verhoeff's description.

The first case was in a lad aged sixteen years. The clinical evidence included semitransparent granulations in the right lower fornix, glandular involvement, temperature 39° C., and enlarged liver and spleen. Increase of eosinophile cells was not found. Bacteriological examination was negative. Histologically there were present beneath the conjunctival epithelium fibroblasts and infiltrations of lymphocytes. The appearance corresponded to that of atypical infectious granuloma. There were areas of Verhoeff's cell necrosis. Leptothrix was not found. The second case was in a female aged 23 years, and resembled the first. In the superficial conjunctival layers were necrotic areas. Inoculations of the granulation tissue from either case in the groin and peritoneum of the guinea-pig produced no reaction. (Four illustrations.)

D. F. Harbridge.

Toulant, P. **Multiple metastatic abscess of the limbus.** Arch. d'Opht., 1928, v. 45, March, p. 189.

One patient showed numerous small

abscesses at the limbus in each eye at the termination of the loops of the anterior conjunctival arteries. He had had a furuncle opened two days before the eyes became irritated and had had a chill several hours prior to the eye symptoms. The eyes cleared in three days without ulceration. The second patient showed three abscesses in the same location in the right eye and had several acne lesions at the same time. No blood cultures were made. The writer believed that the limbal abscesses were caused by infectious emboli lodging in the terminal loops of the anterior conjunctival vessels.

M. F. Weymann.

6. CORNEA AND SCLERA

Ehlers, H. **Some experimental researches on corneal vessels.** Acta Ophth., 1927, v. 5, no. 1, pp. 99-112.

Ehlers studied the neoformation of vessels in the eyes of rabbits irritated by instilling absolute alcohol. Berlin-blue and gelatin were injected into the carotid artery and beautiful specimens obtained. The network of normal capillaries in the limbus always ends in loops. They are mostly superficial but some are deep-seated. New-formed vessels were found to commence as sprouts, a fact denied by several experimenters, which later fused and formed loops. Superficial new vessels shoot their sprouts in an irregular pattern toward the center, gradually taking on an arborization appearance. Vessels in the substantia propria, however, run a much straighter course, with less tendency to branch. The most deep-seated vessels run exactly parallel to the posterior surface of the cornea. In superficial vessels the arterioles and venules do not run a parallel course, whereas this tendency is marked in the more deep seated new formations.

E. M. Blake.

Fischer, F. P. **Research on the permeability of the cornea.** Arch. f. Augenh., 1927, v. 98, May, p. 41.

Fischer experimented with various solutions put in the conjunctival sac and injected into the anterior chamber, and found the cornea to be a semi-

permeable membrane resisting the passage of water. Sodium chloride passes from outward in, but is restrained from within out. The phenomena are due to the presence of the epithelium externally and the endothelium internally. This characteristic of the cornea is lost when it becomes edematous.

F. C. Cordes.

Frieberg, T. **Experience with optical keratoplasty in man.** *Acta Ophth.*, 1927, v. 5, no. 1, pp. 122-136.

Frieberg favors the type of operation in which a disc of the whole corneal thickness is removed by a Hippel trephine. Cases of parenchymatous keratitis offer the best prognosis. The writer has performed the operation nine times, making a four mm. opening in the cornea and covering it with a conjunctival flap. Two eyes were each trephined on three different occasions, with some transparency of the cornea persisting. Microscopic sections of the excised transplant are reproduced. Surgeons are urged to operate upon suitable cases and report their results.

E. M. Blake.

Krautbauer, G. **Platinum chloride tattooing of the human eye.** *Klin. M. f. Augenh.*, 1928, v. 80, March, p. 372.

Four more cases are reported, which prove the value of the new combination of platinum chloride and hydrazin hydrate for permanent bleach tattooing of the cornea. The technique is again described. If this is adhered to, no complications will arise.

C. Zimmermann.

Mans. **The genesis of congenital corneal opacity.** *Graefe's Arch.*, 1927, v. 118, p. 77.

An exhaustive review of the literature on the genesis of congenital corneal opacity is presented, with opinions favoring either Hippel's theory of intrauterine ocular inflammation or Peter's theory of a defect in the development of the cornea. From this survey the author concludes that in these cases of congenital corneal opacity there is present a defect of the endothelium and of Descemet's mem-

brane, combined usually with either a cataractous lens, contact of the lens with the cornea in the area of the defect, aphakia, or the presence of an otherwise normal lens imbedded in the corneal center. If the primitive ectoderm to form the lens and cornea is injured, particularly at its center, then the formation of the lens with its separation from the primitive ectoderm will be affected, and consequently later formation of the cornea.

H. D. Lamb.

Marchesani, O. **Clinical picture of rupture of Descemet's membrane as seen by the slit-lamp.** *Arch. f. Augenh.*, 1927, v. 98, Sept., p. 337.

Marchesani reports a case of seven diopters of astigmatism, which upon examination with the slit-lamp showed three vertical ruptures of Descemet's membrane.

F. C. Cordes.

Meyer, Guido. **The beginnings of gerontoxon.** *Graefe's Arch.*, 1927, v. 119, p. 41.

In observations with the slit-lamp and corneal microscope on 108 individuals, varying in age between five and seventy-five years, it was found that in the majority of cases arcus senilis could be observed as being present at between fifteen and thirty years of age. The first appearance was a flat opacity peripherally in Descemet's membrane, which disappeared under the limbus and was absent at the upper corneal periphery. These changes appeared to about the same extent in each eye and developed quickly or slowly. Long after the first changes in the third decade or later, there occurred a second opacity lying superficially in Bowman's membrane near its periphery. Very gradually these two areas of opacity joined. This happened earlier and more frequently near the superior limbus.

H. D. Lamb.

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Beyer, A. **A case of sympathetic ophthalmia.** *Ophthalmologisk Selskaps Forhandler* (Copenhagen) 1927, p. 30.

On the sixth of February, a piece of iron about five millimeters long was removed from the right eye with the giant magnet. The splinter had perforated the limbus and penetrated the iris. The eye remained free from any precipitates for three months. Then the slit-lamp first revealed fine precipitates, and later larger deposits on Descemet's membrane and marked inflammation appeared. The eyeball was enucleated. At the time of enucleation, the left eye was entirely normal. Two weeks later this eye too began to show fine precipitates on Descemet's. The process went on to seclusion and occlusion of the pupil. Iris bombé developed with increased tension and loss of vision in spite of the most energetic treatment.

D. L. Tilderquist.

Busacca, A., and Melli, G. **Observations on the arrangement of iridocyclitic deposits on the anterior capsule. Occurrence of a ring-shaped zone free from exudate, and its import.** (2 col. pl.) *Klin. M. f. Augenh.*, 1928, v. 80, March, p. 308.

Five cases are described in detail. They showed a ring-shaped zone around the area corresponding to the pupil, which remained free from exudations in light cases. In severe cases of iridocyclitis in which the whole capsule of the lens is covered by exudate, the ring-shaped zone is the first part to become clear, and this indicates beginning subsidence of the process. The authors suggest that perhaps the currents in the aqueous and the shape of the anterior surface of the lens impede or render impossible the adhesion of the deposits on this pericentral zone.

C. Zimmermann.

Grönblad, Ester. **Uveitis in relapsing fever.** *Acta Ophth.*, 1927, v. 5, no. 1, pp. 160-165.

Grönblad observed eighty-five patients who had been inoculated with the spirochete of febris recurrens Duttoni, the African form of recurrent fever. Sixty of the patients had suffered from epidemic encephalitis and twenty-two from dementia paralytica.

Five of these patients suffered ocular complications assumed to be due to the inoculation, a fact frequently noted by Russian writers. Case one developed iritis and hypopyon; cases two and three, vitreous opacities; case four, uveitis; case five, episcleritis and vitreous opacities. The eye symptoms occur as a rule a few days after the last febrile attack, clear slowly, but offer a good prognosis. The literature on the subject is reviewed by the writer.

E. M. Blake.

Höeg, N. **Irregular naevoid coloboma of the choroid.** *Acta Ophth.*, 1927, v. 5, nos. 1-3, pp. 199-205. (2 pl.)

Höeg describes the eyegrounds of a boy of 13 years who showed a peculiar coloboma in each eye. In the left eye the coloboma presented the appearance of a rosette, outlined by pigment and with pigmented spokes radiating to a smaller circle, within which was an island of whitish tissue. In the right eye there was a large pigmented ring, within which a pinkish island was situated. Extending from the nerve and obscuring its temporal border was a band of glistening connective tissue. The author explains the fundus condition as a persistence of mesodermal connective tissue, originally a vascular connection of the papilla which normally disappears, but leaving behind traces in the form of malformation of the papilla, displacement of vessels, and a faulty development of the tissue at the point of connection. The colored plates illustrate the text admirably.

E. M. Blake.

Holm, Ejler. **Pigmented choroidal vessels.** *Acta Ophth.*, 1927, v. 5, nos. 1-3, pp. 188-194. (2 col. pl.)

Two cases are described by Holm in which pigment accumulated upon choroidal vessels in the form of streaks and dots. The first patient was sixty years old and had chronic nephritis and hypertension. The right eye showed a typical star figure at the macula with hemorrhages above the disc and peripherally. The left eye presented dots similar to retinitis circinata and clumps

of pigment in the macula. Downward there was marked depigmentation of the epithelial layer with obliteration of the choroidal vessels in places. The latter showed irregular pigment patches, giving rise to a transversely striped appearance.

The second patient was a man of forty-four years in good health. The choroidal vessels were sclerosed, and in the right eye there was a fine pigmentation of the entire area between the disc and the macula. In the left eye there was greater pigmentation. In both eyes the peripheral choroidal vessels were sclerosed and showed intermittent granular pigmentation. Later on the streaks resembled more closely angioid streaks, and hemorrhages occurred in the central area.

The writer feels that his cases corroborate Treacher Collins' hypothesis as to the location of the angioid streaks. He does not however agree that the pigment comes from hemorrhages, but thinks that it is derived from the pigment epithelium.

E. M. Blake.

Koch, C. **Metastatic ophthalmia.** Zent. f. d. ges. Ophth. u. i. Grenz., 1927, v. 17, p. 481.

Koch reviews metastatic ophthalmia particularly as to etiology. There are ten cases recorded following puerperal fever. It was also observed with furunculosis, neoplasms of the uterus, prostatic abscess, thrombophlebitis and acute mastoiditis. In general infections it has been noted in a variety of conditions; seventeen times in influenza, five times following pneumonia or bronchopneumonia; seven times after intestinal infection; three cases following typhus; twice in inflammatory rheumatism; twice after alveolar abscess; two cases from acute tonsillitis; once each following gonorrhea, typhus, diabetic gangrene, acute jaundice, liver abscess, and pyonephritis; six times with septicemia, twice in measles, and once after suppuration of neck glands. As long as the cause of metastatic ophthalmia in these conditions remains unknown, there is little the oculist can do to combat its development, except

to aid in education along lines of sanitation, hygiene, and the prevention of contagion in infectious diseases.

F. C. Cordes.

Wood, D. J. **Melanosis of the iris and new formation of a hyaline membrane on its surface.** Brit. Jour. Ophth., 1928, v. 12, March, p. 140.

This is the record of a woman aged sixty-three years in whom the iris of the left eye was in contact with the lens of the inner side only and a large pigmented plaque on the iris below. The corneal microscope showed the outer side of the iris raised up in a ridge apparently reaching the cornea. Below the overlying cornea showed fine specks. Remains of pigment on the lens and a coronary cataract were present. All over the outer half of the iris from its root to the pupillary border were large numbers of rounded brown eminences, many casting shadows. The upper pupillary margin showed a large uveal eversion upon which were several nodules. Vision normal. Ten months later the patient was again observed. Vision = 6/9, cornea steamy, details of the iris obscured, and tension higher than the fellow eye. The prominences on the iris had advanced. Under eserine the cornea cleared and tension improved. Three months later, increased tension with pain, and vision = 6/12. The nodules had spread all around the iris and there was a bulge forward above. The eye was enucleated. The sectioned globe showed a hyaline membrane overlying the iris and endothelium, continuous with Descemet's membrane and extending over the edge of the pupil. At the site where the iris was adherent to the cornea the hyaline was thickened. The angle of the anterior chamber was closed by fusion of the two membranes. The prominences on the iris were very numerous. The nodules were composed of round and oval cells, and all contained pigment. The observer concluded that these cells were not small round sarcoma cells but small lymphocytes. The case as a whole must be inflam-

matory. Up to the time when eserine did not lower tension the slit-lamp did not detect any inflammation.

E. Treacher Collins examines sections and discusses the case quite fully, reviewing references to similar cases and those coming under his own observation.

The condition seems to point to a primary congenital defect in connection with the iridopupillary membrane; resulting in its imperfect separation from the back of the cornea, so producing the anterior synechiæ; and persistence of portions of it forming protrusions on the surface of the iris. There must also have been a congenital nevus formation, resulting in production of the abnormal area of pigmentation and areas of embryonic tissue. The endothelium of Descemet's membrane, because of the anterior synechiæ, spread on to the surface of the iris and formed there an abnormal hyaline layer. The hyaline layer, extending round the angle of the anterior chamber in a portion of its extent, as well as over the surface of the iris, must have caused some hindrance to the normal channels of exit for fluid from the eye, and so have predisposed the eye to glaucoma.

Eight microphotographs and one drawing accompany the contribution.

D. F. Harbridge.

8. GLAUCOMA

Alexiades. **Retrobulbar injections of alcohol combined with posterior sclerectomy in painful absolute glaucoma.** Arch. d'Opht., 1928, v. 45, March, p. 172.

Since 1922 the writer has treated twenty-four individuals suffering from absolute glaucoma by the method of retrobulbar injections of alcohol to relieve pain. The case histories of eleven individuals are given. In one group the injections were made merely to relieve pain while substantiating a diagnosis of intraocular tumor, and in the other the relief of pain was desired to precede posterior sclerectomy to relieve tension. In all cases the eyes were blind or had merely light perception.

The technique was to inject one c. c. of alcohol and one c. c. of four per cent novocain in the manner used for injecting the ciliary ganglion. The relief of pain occurred within one-half hour. In some cases it was necessary to repeat the injection within a week but never more than three were necessary. The corneal sensibility was diminished but there was no neuromyolytic keratitis. Some extraocular muscle paralysees occurred but they cleared up within a month. Those patients with light perception retained it after the injection, as the alcohol did not affect the optic nerve. The tension remained the same after injection. To relieve this a posterior sclerectomy with the Elliot trephine or a Graefe knife was done about fifteen to twenty-five days after injection. Two of these patients had to be reoperated. The important features were the immediate relief of pain and the preservation of the globe.

M. F. Weymann.

Enroth, E. **Cataract after Elliot's operation.** Acta Ophth., 1927, v. 5, no. 1, pp. 113-121.

Eighty-nine patients who had been operated upon for glaucoma by Elliot's method were studied by Enroth. Of these, twenty-six developed cataract within from one month to eight years. One-third of these cataracts developed in hypotonic eyes. He concludes that cataract formation following the trephine operation is common, due in fact to senile and glaucomatous degeneration but especially liable to occur in eyes which remain hypotonic.

E. M. Blake.

Gabrielidès, A. **A new procedure permitting iridectomy in case of complete effacement of the anterior chamber.** Arch. d'Opht., 1928, v. 45, March, p. 185.

The patient was one upon whom a cataract operation had been done and who had developed glaucoma and anterior synechia. There was no anterior chamber and an iridectomy downward was desired for optical purposes. A fine needle was passed through the iris

into the posterior chamber, and three and one-half cubic millimeters of aqueous withdrawn. The needle was then withdrawn until anterior to the iris and a small amount of the aqueous injected between the iris and the cornea. The small anterior chamber thus formed permitted the introduction of a thin Graefe knife for iridectomy in the usual manner. After operation the patient developed a hypotony which has continued.

M. F. Weymann.

Holth, S. **Iridencleisis with meridional iridotomy in acute glaucoma. Iridencleisis with transverse iridotomy for infantile glaucoma.** Norsk Mag. f. Laegevid., 1927, Nov.-Dec., pp. 1156-1163.

The author reviews seven cases (eight eyes) of acute glaucoma without a previous chronic glaucoma. In four cases (five eyes) the classical iridectomy of Graefe was done, all performed correctly. These cases were observed for two, fifteen, fourteen, and sixteen years. All the eyes developed, sooner or later, either acute attacks or chronic increase of tension, necessitating the use of miotics. In the other three cases iridencleisis with meridional iridotomy was used. These were watched for nine years, three years, and seven months respectively. In each case there was no call for the use of miotics, there was no increase of tension, and the vision remained good. He offers this theory in explanation of the difference in results of the two methods. Before the advent of cocaine anesthesia it was very difficult to perform an iridectomy correctly, and accidental iris inclusion in the scleral wound was common. These inclusions caused filtrating scars. Hence the iridectomies of Graefe's time gave better results than the more technically correct iridectomies of today.

Holth is strengthened in this theory by having observed two cases, in both of which an iridectomy had been done on each eye for acute glaucoma. In each case an iris inclusion in the wound was seen in one eye with a perfect iridectomy in the other eye; and in

each case the eye with the perfect iridectomy showed increased tension and final loss of vision, while the other eye had normal tension and good vision. Holth therefore advocates the use of iridencleisis in these cases, rather than iridectomy. He prefers iridencleisis to any form of sclerectomy, because the anterior chamber of acute glaucoma is generally very shallow, the incision must be placed a millimeter or less from the clear cornea, and this consideration makes sclerectomy difficult.

In infantile glaucoma (buphthalmos) no form of sclerectomy is successful, for the filtration opening finally becomes closed by scar tissue. Here iridencleisis with transverse iridotomy is more apt to be successful. It is best done from below, for under general anesthesia the eye is apt to be rotated strongly upwards. The incision is placed two millimeters to two and a half millimeters from the limbus. On the day after the operation a drop of atropine solution one per cent is instilled once (not again). Pilocarpine is used for about one year, after which the tension will remain normal.

D. L. Tilderquist.

Kubik, J. **Experimental and clinical examination of the hydrogen content of the aqueous.** Arch. f. Augenh. 1928, v. 98, Jan., p. 483.

Kubik attempted to determine the relation between glaucoma and the reaction of the aqueous. He used the electrometric method of determining the hydrogen-ion content. From his experimental and clinical evidence, he concludes that alkalinity has no relation to glaucoma. In addition, there was nothing in his work that would tend to substantiate Fischer's theory that acidity caused glaucoma. In conclusion, Kubik states that neither alkalinity nor acidity is the cause of glaucoma.

F. C. Cordes.

Safar, Karl. **Cholesterol in the anterior chamber as a cause of glaucoma in hypermature senile cataract.** Zeit. f. Augenh., 1928, v. 64, Jan., p. 46. (See Section 9, Crystalline Lens.)

Samojloff, A. J. **Experiments on the effect of pituitrin injections on the curve of reactive hypertony.** (4 ill.) Klin. M. f. Augenh., 1928, v. 80, Feb., p. 247.

Rabbit irises were injured by the following technique, which was especially designed to avoid the disturbing factor associated with partial emptying of the anterior chamber: The sharp manometer canula was carried into the anterior chamber through the cornea, plunged into the iris and at once withdrawn from that structure, and then carried across to the opposite side of the anterior chamber, where the point made its exit from the cornea. For the purpose of record, no eye was used from which there had been the slightest escape of primary aqueous. In an animal in which this procedure had been followed by increase of intraocular tension to fifty-three millimeters of mercury, subconjunctival injection of 0.5 gm. pituitrin lowered it at once to fifteen millimeters, this tension combining for one and a half hours, when suddenly a new rise of tension with the characteristics of the reactive hypertony curve set in. If, however, the pituitrin injection was made in the auricular vein the tension fell from forty-eight to twenty-five millimeters Hg., but soon commenced to rise again and reached sixty millimeters within two hours.

In the first instance the contraction of the ocular arterioles and capillaries endured and kept the tension low as long as pituitrin remained under the conjunctiva. After it disappeared the vascular contraction ceased and the reactive hypertony produced by the traumatism reappeared.

If the injection is made into the blood current, smaller quantities of pituitrin are conveyed into the ocular vessels, so that they do not have much share in the rise of general blood pressure.

F. C. Cordes.

Schmidt, K. **Capillary endothelial changes in glaucoma simplex.** Arch. f. Augenh. 1928, v. 98, Jan., p. 569.

The test of the capillary endothelium used by Marx consists in giving the patient large quantities of water and taking hemoglobin readings at fifteen minute intervals. In normal individuals this shows a definite curve. Using this test in glaucoma simplex, Schmidt found that of sixteen cases only one had a normal curve. From this he concludes that in otherwise healthy glaucoma patients there is a disturbance of the capillary endothelium, and that this may express itself in the eye as glaucoma. F. C. Cordes.

Serr, Hermann. **The blood pressure in the intraocular vessels.** Graefe's Arch., 1927, v. 119, p. 6.

The blood pressure in the intraocular veins on the papilla is in physiological limits only a little (one to two mm. Hg) higher than the normal intraocular pressure of 20 to 25 mm. Hg.

The pressure in the intraocular capillaries may rise only as far as the diastolic arterial pressure, that is 30 to 45 mm. Hg.

In the intraocular arteries the pressure was found by Bailliart to be 30 to 35 mm. Hg for the diastolic and 55 to 75 mm. Hg for the systolic pressure, and by Seidel 30 to 45 mm. Hg for the diastolic and 55 to 75 mm. Hg for the systolic pressure.

H. D. Lamb.

Wegner, W., and Endres, G. **The relation of intraocular tension to the hydrogen-ion concentration of the blood.** Zeit. f. Augenh, 1928, v. 64., Jan., p. 43.

Contrary to expectations, it was impossible to change the ocular tension by hyperventilation of the lungs to the point of tetanic symptoms, though the reaction of the blood was considerably shifted to the alkaline side. Of course the determination of the reaction of the blood does not demonstrate a similar change in the PH of the aqueous humor, but the experimental work of Campbell (Journal of Physiology, 1923) justifies one in making this assumption.

F. H. Haessler.

9. CRYSTALLINE LENS

Ahlgren, Gurmar. **On the oxidation mechanism of the crystalline lens.** *Acta Ophth.*, 1927, v. 5, no. 1, pp. 1-22.

In his studies of the oxidation processes in the lens, Ahlgren employed Thunberg's methylene blue method, in which one measures the time required for a given quantity of the dye to be completely decolorized by a suspension of minced tissue. The decolorization lens time is a relative measure of oxidation intensity. Oxidation enzymes (dehydrogenases) play an active part in the oxidation mechanism. Oxidation is considerably greater in the lens cortex than in the nucleus, but enzymatic processes are active in both. Succinic acid does not constitute an intermediary stage in the metabolism of the lens, as it does in muscle, brain, and other tissues, hence the metabolism of the lens follows different paths from those of other tissues. Thyroidectomized animals show subnormal oxidation which can be raised by suitable concentration of thyroxine.

E. M. Blake.

Busacca, A. **Zonular lamella and its pathology.** *Zent. f. d. ges. Ophth. u. i. Grenz.*, 1927, v. 18, p. 433.

With a special stain, Busacca was able to show that there was a very thin layer, of special staining properties, that envelops the lens capsule. This becomes decidedly thicker and more pronounced at the equator. To this layer are attached most of the fibers of the zonula; some, however, penetrate to become attached in deeper layers of the capsule itself. This layer constitutes the zonular lamella of the lens. As Meesmann has pointed out, the zonular lamella belongs to the zonula and is attached to the lens capsule by a cement substance.

In one type of luxation of the lens, the zonular lamella is torn from the lens capsule in consequence of separation of the cement substance. In another type, observed particularly in patients exposed to heat over long periods of time (glassblowers, blacksmiths, etc.) a plaque-like tear may

take place rather than a separation of the entire layer. Two such cases have been seen over a long period of time without the development of cataract. Elschmig classes these cases as tears in the zonular lamella rather than tears in the capsule itself.

F. C. Cordes.

Cattaneo, Bonato. **Ultramicroscopic observations on cataract.** *Ann. d'Ocul.*, 1928, Feb., v. 165, pp. 105-119.

Ultramicroscopic examination was made of normal lenses and of cataractous lenses, the former being largely derived from animals. The noncataractous eye was found to be composed of a homogenous system, while the cataractous eye showed differentiation of the protoplasm which is called by the author a heterogenous system. He thinks cataract depends upon the change from the homogenous to the heterogenous system. This comes about by precipitation, in the form of grains or masses of grains or drops, of the proteins which compose the fundamental protoplasm.

L. T. P.

Gallemaerts, E. **Slit-lamp studies of vascular tunic of lens.** *Ann. d'Ocul.*, 1928, v. 165, Feb., pp. 81-97.

The author reviews first the embryologic development of the eye with especial relationship to the lens and the vascular tunic. He then describes the embryologic remnants visible after birth. Many illustrations of the various types of bands extending from the lesser circle of the iris are given. The remnants of the hyaloid as seen with the slit lamp are described and illustrated.

L. T. P.

Grönholm, v. **The question of endocrine etiology of juvenile cataracts.** *Acta Ophth.*, 1927, v. 5, nos. 1-3, pp. 166-187.

Grönholm discusses the possible etiological factors in cataracts occurring in the earlier life, and reports five cases which were carefully studied. In one case the patient was rachitic and had suffered from convulsions, apparently caused by the bony changes in the

skull. The endocrine glands were apparently normal and could only be suspected as a cause. The second case was one of myotonia atrophica, following influenza. There was decreased activity of the thyroid and parathyroid glands. Case three was one of congenital myotonia with hypofunction of the thyroid and parathyroid. The fourth case was one of gigantism with hyperactivity of the anterior lobe of the pituitary, hyperplasia of the thyroid, and diabetes insipidus. The fifth case showed hypoplasia of the pituitary and thyroid glands, and anomaly and hypoplasia of the base of the skull. All five cases had bilateral rapidly developing cataracts. *E. M. Blake.*

Möller, H. U. **Axial hyperrefraction of the lens.** *Acta Ophth.*, 1927, v. 5, nos. 1-3, pp. 258-266.

Möller's patient was sixty-one years old and obtained the best distant vision with -2.00 D. sphere. After dilating the pupil a +4.00 sph. and a stenopaic slit gave the same vision. The slit-lamp disclosed an anterior and a posterior capsular cataract, speckled at the periphery, and a marked bowing forward of the anterior surface of the nucleus. The increased central refraction was produced by the increased convexity of the center of the nucleus, the peripheral parts being concavo-convex. This condition was probably congenital, since it was bilateral. The article contains a valuable discussion of the curves and surfaces of discontinuity as seen with the slit-lamp. *E. M. Blake.*

Morax, V., and Chiazzaro. **Infection of crystalline lens.** *Ann. d'Ocul.*, 1927, v. 164, April, pp. 241-258.

Seven cases of lens infection are described. The foreign bodies were in four cases magnetic, in one a piece of stone, in another a tooth of a comb, and in another a chip of cement. Six of the seven were objects that had been in contact with the soil, and in six of the cases spore bearing bacilli were found. Three of these were identified as subtilis and the remaining four

could not be identified. The reason for the development of spore-bearing organisms in the crystalline is to be discussed in a later communication.

L. T. P.

Orloff, K. C. **Etiology of postoperative iridocyclitis.** *Klin. M. f. Augenh.*, 1928, v. 80, March, p. 326.

Lens matter possibly does not play the important part ascribed to it in the postoperative course, but only furnishes a favorable soil for microorganisms entering the anterior chamber, or arising endogenously, i.e. metastatically, as from dental affections. Two such cases are described in which extraction of carious teeth cured the iritis. *C. Zimmermann.*

Safar, Karl. **Cholesterol in the anterior chamber as a cause of glaucoma in hypermature senile cataract.** *Zeit. f. Augenh.*, 1928, v. 64., p. 46.

In an eye with hypermature senile cataract and glaucoma, neither luxation of the lens nor uveal inflammation was demonstrable as the cause of increased tension. As seen with the slit-lamp, numberless fine opalescent particles moved in the anterior chamber with the current of the aqueous. Chemical examination of the aqueous demonstrated that the particles were cholesterol crystals which presumably came from the lens through its intact capsule. Since the tension of the eye returned to normal after paracentesis but gradually rose as the newly formed aqueous became filled anew with cholesterol crystals, their etiological significance seems clear.

F. H. Haessler.

10. RETINA AND VITREOUS

Ask, Fritz. **The dextrose content of the vitreous.** *Acta Ophth.*, 1927, v. 5, no. 1, pp. 23-28.

Ask found that in normal rabbits and those who suffered an experimental adrenalin hyperglykemia, also in certain pathological conditions of human eyes and in fluid vitreous, the vitreous had a lower sugar content than the aqueous humor. This is explained as

partly due to differences in diffusion and partly to the pressure of colloidal substances in the vitreous. The author suggests that the increase in intraocular pressure which occurs with uveal tumors may be due to an abnormal water and colloid combination or to a blockage of the excretory channels with colloidal substances.

E. M. Blake.

Edmund, Carsten. **On erythroptosis and xanthopsia in hemeralopia.** *Acta Ophth.*, 1927, v. 5, no. 1, pp. 88-98.

Edmund's patient was a woman of fifty-five years, suffering from hemeralopia for six months. Toward dusk lighter objects appeared reddish, while during the day a yellowish cast was observed, especially upon green objects. Physically, the patient was normal and there was no disease of the eyes, but she was upon a poor diet for some time. Improvement followed the use of tablets of vitamin A. Experiments showed that if brightness is reduced, one loses first the power of discerning pure green, afterward of recognizing red, whereas violet can be seen as long as the field can be distinguished. Vision at dusk is violet vision. This patient lacked the increase of violet sensibility which normally takes place during rest.

E. M. Blake.

Glüh, B. **Experiments on the formation of visual purple in icteric rabbits.** *Zeit. f. Augenh.*, 1928, v. 64, Jan., p. 69.

Visual purple can easily be extracted in bile salt solution from retina which has been dissected out, and it has been suggested that the hemeralopia which sometimes accompanies icterus is due to removal of visual purple from the retina by the icteric blood. The author found no difference in the visual purple content of normal rabbits and rabbits made icteric by ligation of the common bile duct. Consequently he doubts that the hemeralopia of icterus is caused by removal of visual purple from the retina by the bile salts in the blood.

F. H. Haessler.

Guggenheim, I., and Franceschetti, A. **Refractometric examinations of the vitreous in rabbits and man.** *Arch. f. Augenh.*, 1927, v. 98, Jan., p. 448.

Guggenheim and Franceschetti studied the albumin content of the vitreous in rabbits and man under normal and pathological conditions. The Abbé refractometer was the instrument used. They found that the normal refractive index of the vitreous in rabbits varied from 1.3342 to 1.3349. Following puncture of the anterior chamber, there is an increase in the albumin, reaching its maximum in about two hours and receding to normal at the end of ten days. Subconjunctival injection of salt produced a change in concentration of ten per cent or more. Only after frequent anterior chamber punctures was the refractive index of the vitreous altered, while puncture of the vitreous increased the albumin content of the aqueous. In congenital hydrophthalmos of rabbits, the albumin content of the vitreous is unaltered. In man, in cases of inflammation and in two cases of retinal glioma, the authors found a marked increase in the albumin content. The decided increase in the albumin content in vitreous puncture gives a scientific basis for the vitreous puncture advocated by Zur Nedden, as in increase in the albumin content produces an increase in the defense bodies.

F. C. Cordes.

Morax, V., and Kerbrat. **Transitory blindness in infants.** *Ann d'Ocul.*, 1927, v. 164, June, pp. 401-412.

The authors describe a case of sudden blindness in a two-year-old child, which came on in the course of twenty-four hours without other symptoms. Examination revealed widely dilated pupils, a greyish yellow tinge to the retina with bright red fovea, suggesting embolism of the central artery of the retina. Along the vessels there were white streaks almost uninterrupted. The veins were slightly engorged and slightly tortuous. There were no hemorrhages. Pupils reacted very slightly to light and there appeared to be no sight. Treatment, on

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account of a suggestive Wassermann reaction in the mother, was novarsenobenzol. The vision slowly recovered. When tested five years later, it was right eye 5/20, left eye 5/10, unimproved with glasses. This condition has been recognized occasionally in the literature since the invention of the ophthalmoscope. The disease is generally thought to be a vascular disease associated with hereditary syphilis.

L. T. P.

Nordenson, J. W., and Nordmark, T. **Investigation as to color of macula.** *Upsala Läkareförenings Förhandlingar*, 1928, v. 33, pp. 499-506.

The eyes of cadavers were examined with a view to determining the color of the macula. In order to prevent clouding of the cornea through drying, an ordinary contact glass was used which covered only the cornea and which was brought into optical contact by means of a drop of salt solution. A diaphragm lamp (Gullstrand) equipped with a pointolite globe was used for the observation of the fundus. By this method twenty eyes were viewed, the first examination in each case being usually within an hour after death, and repeated after that often every half hour. Sometimes the media would remain fairly clear to the end of twenty-four hours.

About half an hour after death, the fundus appears like that in the living, except that sometimes the blood vessels are partly empty. In about an hour after that there appears in the macula a small bright red spot, in diameter about one-fourth of that of the disc: this is surrounded by a narrow gray zone of cloudy retina. This gray band spreads over the whole fundus in three or four hours. No yellow is seen either around the red spot or in other parts of the retina.

D. L. Tilderquist.

Schreiber, Z. **Abnormal course of a retinal vessel.** *Zeit. f. Augenh.*, 1928, v. 64, Jan., p. 65.

In each of two eyes enucleated because of the end results of infection and glaucoma, all the histological sections showed a retinal artery which

traversed all the layers of the retina, including the pigment epithelium. After lying in part of its course directly on the choroid, it returned to the inner layers of the retina. In structure the arteries were normal, and there was no evidence of inflammation in the contiguous tissue which might have resulted in displacement of the vessel. The vessel was found in the mid-line and below. The pigment epithelium was only absent here and was turned inward alongside the vessel. It is assumed that the presence of an artery in this position represents a coloboma of the retina at the site of the embryonic optic cup. No other such finding was found recorded in the literature.

F. H. Haessler.

Wegner, W. **The function of the human retina in experimental ischemia retinae.** *Arch. f. Augenh.*, 1928, v. 98, Jan., p. 514.

The loss of vision due to interference with the retinal blood supply has been known for many years, but there are few accurate data available as to the length of time necessary to produce permanent changes. Wegner produced ischemia retinae and recorded his findings after varying periods of anemia. For the longer periods, he used "lost eyes," as in cases of sarcoma of the choroid. He found that the retina tolerated a complete loss of circulation for fifteen minutes without permanent damage. During this time, there was complete amaurosis. Forty-five minutes of complete cessation of circulation produced permanent loss of vision. An incomplete cutting off of circulation for a similar period of time did not cause any lasting loss of function. In carrying out this last experiment, sufficient pressure was used to produce a collapse at the time of diastole, thus allowing circulation only at the time of the pulse. Slowly raising the pressure on the eye, with subsequent gradual loss of circulation, produced gradual loss of vision. In older people, greater pressure was necessary to produce the same effect. The fovea centralis was not found more vulnerable than the remainder of the retina.

F. C. Cordes.

Will, Heinz. **A case of vitreous hemorrhage after head injury.** *Zeit. f. Augenh.*, 1928, v. 64, Jan., p. 40.

In general there are two causes of vitreous hemorrhage, (1) disease of the arteries, (2) perforations and contusions of the eyeball. Hemorrhages into the vitreous after bodily trauma without direct injury to the eyeball have been mentioned twice in the literature. Will adds a third case. His

patient slipped and fell against a piece of furniture. For several hours he was unconscious. He bled from ears, nose, and mouth, but there was no direct injury to the eye, yet he was almost blind from massive bilateral vitreous hemorrhages, from which he recovered in the course of months so as to regain at least useful vision. The author assumes that latent vascular disease was made manifest by the trauma.

F. H. Haessler.

NEWS ITEMS

News items in this issue were received from Drs. E. M. Blake, New Haven; C. A. Clapp, Baltimore; W. F. Hoffman, Seattle; J. M. Patton, Omaha; G. Oram Ring, Philadelphia, and M. F. Weymann, Los Angeles. News items should reach **Dr. Melville Black** by the twelfth of the month.

Miscellaneous

It is announced that membership in the International Ophthalmological Congress, to be held in Amsterdam, Holland, in September, 1929, may be obtained by sending a check to the treasurer of the Congress, Mr. H. M. Roelofs, at the Incasso Bank, Postcheque Konto 8074 Amsterdam. The fee for members is \$10.00, for associates \$5.00.

The Indiana University News-Letter announces that during the summer of 1928 short courses, beginning June 14 and lasting for six weeks, will be offered to the physicians of Indiana by the Indiana University School of Medicine in Indianapolis. Clinics will be held in a number of subjects, including ophthalmology, rhinology, otology, and laryngology. Information may be obtained from the Registrar, Indiana University School of Medicine, Indianapolis.

The directors of the British Journal of Ophthalmology state that the continued prosperity of that journal enables them to announce a proposal for furthering research, by granting subsidies toward the expenses of those qualified to undertake such work. (Issue of April, 1928, page 214.)

A bequest of \$100,000 was recently made by Mr. Crane to the Hartford Hospital, Hartford, Connecticut, for the erection of an eye and ear hospital.

For advanced legislation Mississippi takes the lead in a bill which has been introduced into its legislature for the purpose of raising additional revenue. It is proposed to tax adult males in proportion to their visual acuity, calling this a "privilege tax." A unique method of raising revenue! What next?

The Guild of Prescription Opticians of America asks us to announce that, in the March issue, the name of William Darling,

221 East State Street, Trenton, New Jersey, was inadvertently left off the list of the Guild's members.

Societies

On March 31, there was a reunion of the class of '78 of Jefferson Medical College in Philadelphia. Thirteen members were in attendance from a class of two hundred and three. Dr. L. Webster Fox presided.

The section on ophthalmology of the College of Physicians of Philadelphia met Thursday evening, April 19, at the College of Physicians building. The following program was given: Dr. Louis Lehrfeld, by invitation, "Exhibition of a quantitative pupillary light-reflex instrument"; Drs. H. Maxwell Langdon, Frederick H. Leavitt, and George B. Wood, "A case of involvement of the orbit from accessory nasal sinus disease closely simulating cavernous sinus thrombosis"; Dr. L. Waller Deichler, "The triple light as a practical method of perimetric illumination"; Dr. Emory Hill, of Richmond, Virginia, by invitation, "Clinical studies in brain tumor"; Dr. Wm. Zentmayer, "A case of toxic amblyopia due to the absorption of a toxic agent through the skin"; Drs. Perce De Long and W. G. Mengel, by invitation, "Pathological report on a case of retinal disease with massive exudation" (lantern slide demonstration); and Drs. T. B. Holloway and George F. Calvin, by invitation, "Spontaneous subdural hemorrhage".

The papers on ophthalmological subjects given at the meeting of the Pacific Coast Oto-ophthalmological Society at Santa Barbara, on April 19, were as follows: "The comparative value of glaucoma operations", by Luther C. Peter; "Fracture of the optical canal", by Otto Barkan; "Glaucoma, an historical review", by Kaspar Pischel; "Radium

therapy in vernal catarrh", by Frederick C. Cordes; "The diagnosis of motor palsies", by Joseph L. McCool; "Photography of the fundus with the Nordenson camera", by George N. Hosford. There were golf tournaments at the La Cumbre and Montecito country clubs for the visitors, under the supervision of Dr. Walter Scott Franklin. The annual banquet at the Montecito country club was quite a successful affair. Dr. Edward Jackson, of Denver, honored the society by being present at the ophthalmological section. The registration was 126. The meeting was followed on April 21 by a meeting of the Western Section of the American Laryngological, Rhinological, and Otological Society, which most of the members of the Pacific Coast Society attended by invitation.

The Chicago Ophthalmological Society and the Chicago Laryngological and Otolaryngological Society held a joint meeting and clinics on May 7 and 8. In the evening of May 7, there was a dinner and a joint meeting with the Eye, Ear, Nose, and Throat Section of the Illinois State Medical Society. Clinics were held at the Illinois Eye and Ear Infirmary, Cook County Hospital, Rush Medical College, the University of Chicago, the College of Medicine of the University of Illinois, Northwestern University, the Chicago Eye, Ear, Nose, and Throat College, the Illinois Postgraduate Medical School, the Chicago Postgraduate Hospital, the Chicago Polyclinic Hospital, and Grant Hospital. At the dinner on May 7, an address was given by Dr. Frank E. Burch, of the University of Minnesota, on English contributions to cataract surgery, and an address by Captain Norman A. Imrie, of the Culver Military Academy, on foreign relations.

At Denver, Colorado, July 16 to 28, will be held the sixth annual summer graduate course in ophthalmology and otolaryngology under the auspices of the Colorado Ophthalmological Society and the Colorado Otolaryngological Society. Dr. Walker Parker, of Detroit, will give a five-hour course on choice and indications for intraocular operations; Dr. Sanford R. Gifford, of Omaha, a four-hour course on the principles of ocular therapeutics, and on diseases of the eye and its adnexa due to fungi and higher bacteria; Dr. Edward Jackson, a four-hour course on practical applications of physiological optics. Other special courses will be given by Drs. C. F. Kemper, F. G. Ebaugh, Melville Black, and W. C. Finnoff. The special features in otolaryngology will be given by Dr. Samuel Iglauer, of Cleveland, Dr. Perry Goldsmith, of Toronto, Dr. Arthur W. Proetz, of St. Louis, and Dr. H. J. Prentiss, of Iowa City, as well as by a group of Colorado otolaryngologists. The secretary of the course is Dr. W. M. Banc, Republic Building, Denver, and the treasurer, Dr. H. L. Whitaker, Metropolitan Building, Denver.

The sixteenth annual meeting of the Oxford Ophthalmological Congress will be held at Keble College on July 5, 6, and 7, under the presidency of Mr. Philip H. Adams. On July 5 a symposium will take place on the ultraviolet ray, introduced by Professor Leonard Hill and Mr. W. S. Duke-Elder. The Deyne Memorial Lecture will be delivered on the morning of July 6 by Professor Arthur Thomson, his subject being "Observations on the eyes of birds". One afternoon will be devoted to demonstrations. The annual dinner of the Congress will be held on July 5. The full program will be issued during June. Mr. Bernard Cridland (Salisbury House, Wolverhampton) is again acting as honorary secretary.

Personals

Dr. and Mrs. Sanford R. Gifford, of Omaha, spent the month of May in Mexico City.

Mr. John Marshall has been appointed visiting surgeon to the Glasgow Eye Infirmary.

Mr. Rupert Scott has been appointed assistant surgeon to the Royal London Ophthalmic Hospital.

Dr. A. M. Yudkin has been made an associate clinical professor in the Ophthalmological Department of Yale University.

Dr. C. A. Noland, of Boone, Iowa, was a visitor at the April meeting of the Omaha and Council Bluffs Eye, Ear, Nose, and Throat Society.

In addition to Drs. A. S. and L. D. Green, Drs. E. V. Blak and M. D. Icove, of San Francisco, announce the removal of their offices to the Greens' Eye Hospital.

Dr. William Finnoff, of Denver, was the guest of honor at the annual meeting of the eye, ear, nose, and throat section of the Nebraska State Medical Society, May 14, at Hastings, Nebraska, and delivered the address of the evening.

Dr. A. W. Adson, of Rochester, Minnesota, was the guest of honor at the annual meeting of the Omaha and Council Bluffs Eye, Ear, Nose, and Throat Society, and delivered an instructive address on "The diagnosis and management of brain tumor".

Dr. Harold Gifford of Omaha came home the latter part of April from a trip through Africa, including a visit to the Paul Kruger game reserve and an overland trip from Mombasa to the head waters of the Nile, and returning via Cairo and Paris.

The following were transient visitors at the Wilmer Institute immediately after the recent meeting of the Congress of Physicians and Surgeons in Washington: Drs. William Wilder, E. V. L. Brown, and T. C. Kronfeld, of Chicago; Arnold Knapp, of New York; Francis H. Williams, of Boston; Francis H. Adler, of Philadelphia; Emory C. Haden, of Houston, Texas, and Harvey J. Howard, of St. Louis.

Dr. and Mrs. Howard Forde Hansell, of Philadelphia, recently sailed for Europe on the steamship "France". They will remain abroad until October.

Dr. Arthur M. Yudkin, of New Haven, Connecticut, was elected to membership in the American Ophthalmological Society at its recent meeting in Washington.

Dr. C. E. G. Shannon, of Jefferson Medical College, accompanied by Drs. Heed, Cross, and Harrison, of Philadelphia, recently visited the Knapp Memorial Hospital in New York to witness a series of intracapsular cataract operations by Dr. Arnold Knapp.

While Dr. A. T. Wanamaker was driving from Seattle to the meeting of the Pacific Coast Oto-Ophthalmological Society in the latter part of April, his machine skidded and ran into the ditch, fracturing three of the doctor's ribs and badly bruising Mrs. Wanamaker.

Drs. W. O. Bell, J. T. Darling, Frank Chase, and M. R. Waltz drove down from Seattle for the meeting of the Pacific Coast Oto-Ophthalmological Society at Santa Barbara.

Papers of special interest: The papers here listed have been read by members of the editorial staff and collaborators, or attention has been called to them by readers. They seem worthy of bringing to the notice of ophthalmologists in general, although some of them cannot be abstracted or reproduced to advantage. Any reader who wishes to become acquainted with all that is written on a particular topic should go over the Cumulative Index Medicus, published by the American Medical Association, and check the titles of articles that refer to the subject or subjects in which he is particularly interested. It is hoped that this brief list of important papers and monographs will be more helpful to the mass of readers than the longer lists.

E. J.

Abadie, C. Acute glaucoma cured by medical treatment. *Soc. d'Ophth. de Paris*, 1928, March, p. 103.

Andervont, H. B., and Friedenwald, J. S. Vacciniform blepharitis. *Bull. Johns Hopkins Hosp.*, 1928, v. 42, p. 1.

Barkan, H. Air embolism of retinal vessels. *Tr. Amer. Ophth. Soc.*, 1927, v. 25, p. 225.

Birnbacher, T. Acute primary necrosis of iris. *Zeit. f. Augenh.*, 1928, v. 64, p. 227.

Derby, G. S., and Carvill, M. Anterior ocular tuberculosis. Cases followed over a period of years. *Tr. Amer. Ophth. Soc.*, 1927, v. 25, p. 104.

Florian, C., and Polack. Correcting glasses for high ametropia. *Soc. d'Ophth. de Paris*, 1928, Feb., pp. 65 and 71.

Holloway, T. B. Angioid streaks of fundus oculi. *Tr. Amer. Ophth. Soc.*, 1927, v. 25, p. 173.

King, C. Tuberculous iridocyclitis and heterochromia of Fuchs. *Tr. Amer. Ophth. Soc.*, 1927, v. 25, p. 380.

Marlow, S. M. Nonoperative treatment of chronic glaucoma. *Arch. of Ophth.*, 1928, v. 57, p. 165.

Narayana, B. K. Vernal conjunctivitis. *Indian Med. Gaz.*, 1928, v. 63, p. 10.

Pastore, F. Differential diagnostic symptoms in hemianopsias. *Riv. Oto-Neuro-Oft.*, 1927, v. 4, p. 557.

Reese, W. S., and Weinberger, N. S. Congenital and early developmental variations of eye and orbit. *Atlantic Med. Jour.*, 1928, v. 31, p. 389.

Sattler, C. H. Apparent divergence of eye from abnormal position of fovea. *Zeit. f. Augenh.*, 1928, v. 64, p. 349.

Thomson, E. Unilateral chronic anterior uveitis in children. *Brit. Jour. Ophth.*, 1928, v. 12, p. 189.

Török, E., and Redway, L. D. Cases of keratoconus. *Tr. Amer. Ophth. Soc.*, 1927, v. 25, p. 123.

Vernon, M. D. Methods of recording eye movements. *Movements of eye in reading.* *Brit. Jour. Ophth.*, 1928, v. 12, p. 113 and p. 130, respectively.

Wagener, H. P. Retinitis of malignant hypertension. *Tr. Amer. Ophth. Soc.*, 1927, v. 25, p. 349.